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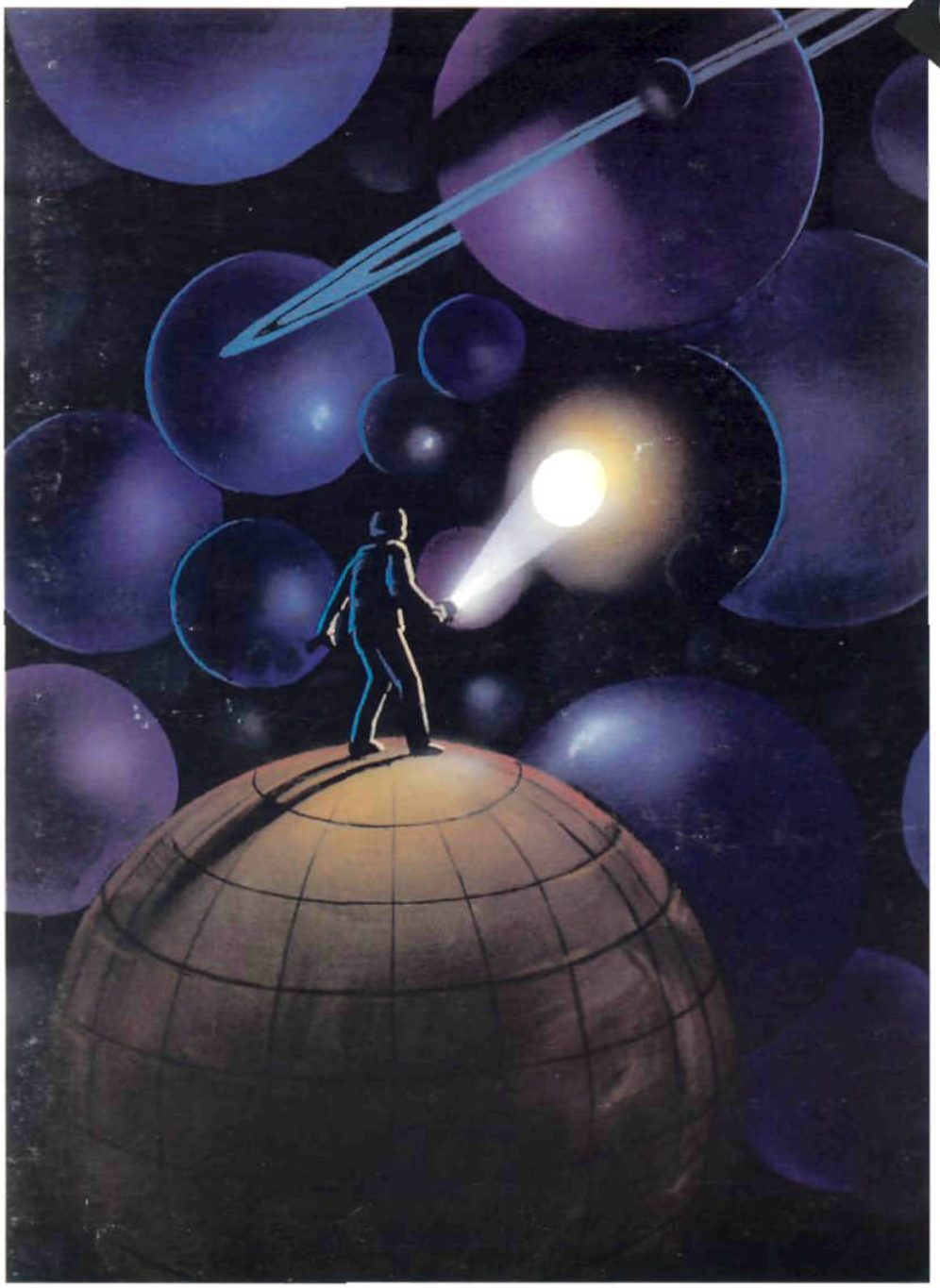

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PUBLISHED BY THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION OF CLAIMS OF THE PARANORMAL

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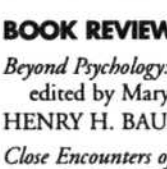

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Editor's Note

Infinities of Ignorance, and a Valued Colleague's Message

Scientific knowledge of the natural world has been expanding at exponential rates. Does this mean that we are getting close to some kind of complete understanding of the universe? I don't think any scientist seriously thinks so, but still the assertion is sometimes heard.

In "The Paradox of Knowledge," in this issue, Lee Loevinger thoughtfully explores "the infinity of our ignorance" from the viewpoint of one who understands and deeply appreciates science. "Ignorance gives rise to inquiry that produces knowledge, which, in turn, discloses new areas of ignorance," he notes. The paradox of knowledge is that the ignorance may increase more *than its related knowledge. Should this be troubling? I think it contributes to the joy of science, for discovery continually reveals new questions and mysteries, and there will be no end to either.*

I have never found anything on the subject of consciousness simple to understand. Huntley Ingalls's "Consciousness as a Valid Subject for Scientific Investigation" may be better than most. I still wouldn't call it an easy read, but I do think your time with it will be rewarded. It brings clear thinking to the subject, makes important distinctions, uses vivid analogies, and shows why the topic has gained new scientific legitimacy.

• • •

Our new Center for Inquiry building in Amherst, New York, was dedicated June 9, and it was an exciting and fulfilling event for all of us. This new building, interconnected with existing buildings across the road from the State University of New York at Buffalo's Amherst campus, completes the joint headquarters of the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP), publisher of the SKEPTICAL INQUIRER, *and the Council for Democratic and Secular Humanism, publisher of* Free Inquiry. *Steve Allen, a true Renaissance man who exemplifies the values of both organizations, hosted. Distinguished scholars spoke.*

But it is the words of one who could not attend that we have chosen to publish first in this issue (see page 55). James Randi is a hero to us, as well as to tens of thousands of you. To us, he is also a colleague and a friend for whom we have true and unlimited affection. The recent legal difficulties he and CSICOP have been put through have been painful for all of us, but those feelings never wavered. It is good to hear Randi's warm and stirring words, and his undiminished determination to advance the cause of reason and rationality.

News and Comment

Harvard Launches John Mack Attack: Abduction Psychiatrist's Scholarship Questioned

Harvard University has launched an investigation of John Mack, the tenured professor of psychiatry who has spent the past few years arguing that people who believe they have been abducted by space aliens may actually be victims of extraterrestrial kidnappings.

Mack's Harvard credentials, plus the fact that he won a Pulitzer prize for his biography of T. E. Lawrence (better known as Lawrence of Arabia), have helped make him the leading light in the UFO field and turned his book on alleged extraterrestrial kidnappings into a best-seller.

At press time, the Harvard probe, led by former *New England Journal of Medicine* Editor Arnold Relman, had not been completed. Because Harvard is a private institution, it is possible that the report by the Relman committee, along with any sanctions made against Mack, will not be made public.

Relman, Harvard University, Mack, and Mack's Boston lawyer, Roderick MacLeish, Jr., have all refused to comment.

The probe became known after Mack's former lawyer, Daniel P. Sheehan, began soliciting letters of support for Mack from scientists interested in UFOs.

In his letter of request, Sheehan said Harvard's "special faculty committee" was acting in "secret," and had prejudged the tenured professor. Sheehan alleged that the committee wrote a draft report of its findings of fact "before Dr. Mack was ever informed of any specific accusations of misconduct made against him and before Dr. Mack had been accorded any opportunity whatsoever to present any defense."

Sheehan's letter said the Relman committee had concluded: "When carefully investigated, such sightings [of UFOs] have been proven to be erroneous, fraudulent, or due to a known natural or man-made phenomenon."

Sheehan's letter quoted the committee as saying that if Mack is going to assert that virtually every claim of UFO abduction is accompanied by concrete physical evidence of a kidnapping, "we believe that Dr. Mack has an obligation to document some of this claimed physical evidence."

Sheehan's letter also said that the Harvard committee had concluded in its draft report that it is irresponsible for any scholar or practicing psychiatrist to give credence to the alien abduction idea until all other possibilities, including seizures, vivid dreams, and all other conditions can be ruled out.

The Harvard committee, according to Sheehan's version of the draft report, accused Mack of encouraging patients to believe they have been abducted by extraterrestrials when he should be discouraging that belief.

Some of Mack's supporters have depicted the probe as an assault on academic freedom. Sheehan said the Harvard investigation was an attempt to "silence John in his effort to speak out to the world about this important phenomenon and his conclusions about it."

Sheehan offered a three-page sample letter for UFO researchers to use as a template for support letters to Relman and the Harvard committee.

News of the investigation broke just as Mack and Ballantine Books were beginning to promote the publication of the paperback edition of his UFO book, *Abduction: Human Encounters with Aliens.*

During a press conference conducted via conference call, Mack again declined to comment on the investigation. He did, however, offer comments on several other subjects.

Mack acknowledged that there have been conflicting accounts of abduction—such as the way people say they are brought into rooms that look like they couldn't possibly fit inside the spacecraft; or the way some abductees report that their captors are cold and unfeeling, while others feel a powerful bond.

"It's one way one time and it's another way" another time, said Mack. "Everything you say about it you can contradict and it drives linear minds crazy because it isn't one way."

Mack declined to cite a specific case that would be compelling enough to convince skeptics, saying, "You get your best case and it always gets shot down because somebody finds a fault."

Other comments from Mack at his press conference:

• On whether anything will convince him that the phenomenon he's studying has nothing to do with UFOs and space aliens: "Of the hundreds of these cases, now thousands that have been reported, not one has ever—with all the attacks on the people who do this work—turned out to yield another explanation."

• On one case that has produced an alternative explanation—the Gulf Breeze UFO photographs, which were discredited after a neighborhood youth reported helping photographer Ed Walters make them and a UFO model was found hidden in the attic of Walters's house: "Somebody planted apparently some sort of a model which

was very crude. . . . All of the concentration was on the model, and no way could [it] have produced the [Walters] photographs. . . . [As for the youth who said he helped with the photographs] it turns out that he was put up by his father to do this as a scam. The field is full of that kind of thing."

• On the anecdotal evidence in his cases: "It is not anecdotal. If you get a very detailed interview with someone for two hours, and then work with them for several hours more, this is not anecdotal. This is what a human being says to another human being."

• On how the abductions relate to the fate of the world: "The fact of the matter is that we have 15 to 20 years before the psychological, moral, physical, and environmental collapse of the Earth as a living entity becomes altogether a reality. This is not apocalyptic thinking. This is scientific, predictable fact if you just move the clock ahead from what's going on now." Altering that fate, he said, would require "a dramatic, radical change in human consciousness." The abductions, which appear to originate from "another dimension," seem to be part of an effort to change human consciousness, he said.

• On whether mankind's continued existence two decades from now will prove him wrong: "I don't think so because we will never know exactly what brought about the incredible transformation of our behavior and consciousness that would be required for that to happen."

—C. Eugene Emery, Jr.

Gene Emery is the science writer for the Providence Journal-Bulletin, *75 Fountain St., Providence, RI 02902.*

American Physical Society Finds No Scientific Substantiation for Linking Power Lines, Cancer

The Council of the American Physical Society, the not-for-profit principal membership organization of physicists in the United States, has issued a statement, "Power Lines and Public Health," declaring purportedly negative health effects of the power line fields have not been scientifically substantiated and the cost of mitigation and litigation "is incommensurate with the risk, if any." According to Robert L. Park of the American Physical Society's Washington office, the APS Council statement, approved at its April 22 meeting, was a result of several years of discussion and monitoring of the issue by the APS Panel on Public Affairs, and was endorsed by the leaders of APS's Biophysics Division. He said this is the strongest position on the issue taken by a major scientific society.

Here is the full text of the statement:

"Physicists are frequently asked to comment on the potential dangers of cancer from electromagnetic fields that emanate from common power lines and electrical appliances. While recognizing that the connection between power line fields and cancer is an area of continuing study by research workers in many disciplines in the United States and abroad, we believe that it is possible to make several observations based on the scientific evidence at this time. We also believe that, in the interest of making the best use of the finite resources available for environmental research and mitigation, it is important for professional organizations to comment on this issue.

The scientific literature and the reports of reviews by other panels show no consistent significant link between cancer and power line fields. This literature includes epidemiological studies, research on biological systems, and analyses of theoretical interaction mechanisms. No plausible biophysical mechanisms for the systematic initiation or promotion of cancer by these power line fields have been identified. Furthermore, the preponderance of the epidemiological and biophysical/biological research findings have failed to substantiate those studies which have reported specific adverse health effects from exposure to such fields. While it is impossible to prove that no deleterious health effects occur from exposure to any environmental factor, it is necessary to demonstrate a consistent, significant, and causal relationship before one can conclude that such effects do occur. From this standpoint, the conjectures relating cancer to power line fields have not been scientifically substantiated.

These unsubstantiated claims, however, have generated fears of power lines in some communities, leading to expensive mitigation efforts, and, in some cases, to lengthy and divisive court proceedings. The costs of mitigation and litigation relating to the power line-cancer connection have risen into billions of dollars and threaten to go much higher. The diversion of these resources to eliminate a threat which has no persuasive scientific basis is disturbing to us. More serious environmental problems are neglected for lack of funding and public attention, and the burden of cost placed on the American public is incommensurate with the risk, if any."

Examining an 'Unsolved Mysteries' Report of a 'Miraculous' Cure

On May 5, 1995, NBC-TV's "Unsolved Mysteries" featured a Fort Lauderdale, Florida, woman who, a few years ago, allegedly experienced a "miraculous" healing, through prayer, of a breast lesion suspected of being cancerous. According to the television program host, Robert Stack, on Friday, December 1, 1991 [Friday was actually November 29], 42-year-old K.B. [she was 44] underwent an ultrasound/sonogram test "confirm[ing] a large lump in her right breast. [Her] doctors fear the worst—cancer. She was directed to come back on Monday for a biopsy, and possible mastectomy." A mammogram performed on the same Friday was also said to reveal a suspicious "lump."

K.B., says Stack, "had read about the power of prayer and meditation."

She then appears in person on the program to explain how she "concentrat[ed] my whole weekend on healing. . . . I [asked] God to heal me. . . . I just heard a still, small voice in my head, just like you read about in the books. I felt the peace that passes all understanding. . . . The [fear and] anxiety went away. I became very convinced that I was healed."

On the following Monday, another mammogram was performed "just prior to her [scheduled] biopsy. K.B.'s doctor was dumbfounded," says Stack, because the suspicious spot was gone. "He was cautious, and wanted to conduct the biopsy anyway [but] K.B. was adamant—she was going home."

Says K.B., "I [told] all the nurses . . . 'I'm healed. . . . This is an early Christmas present from God.'" And her follow-up exams have been normal ever since.

Brian Weiss, a psychiatrist and author specializing in past-life regression who was also on the program, comments: "For many years doctors have . . . explained [these phenomena] away, 'Oh, that's just a spontaneous remission.' But what is that? This is a healing. And we have to, as healers, find out how this happens, what are the mechanisms."

Larry Dossey, author of *Healing Words* (see my review in *SI*, Summer 1994), claims on the show that "currently there are over 130 studies" scientifically establishing the efficacy of prayer in healing. Stephen Barrett, a physician and co-chairman of CSICOP's Health Claims Subcommittee, then comments skeptically about the quality of the evidence regarding prayer and healing.

After the program aired, I contacted K.B. by phone (her real name was used on the show). She told me she had copies made of her pertinent sonogram and mammogram films for "Unsolved Mysteries." Although nothing compares to seeing the originals in person, the copies projected on television with sufficient clarity so as to immediately lead me in another direction, one shared by a radiologist to whom I showed the videotape. The lesion on the sonogram appeared very smooth and oval with few internal echoes, characteristic of a benign, fluid-filled cyst (or, less likely, a benign, solid fibroadenoma). The Friday mammogram also revealed a spot, circled on the film, which looked more nodular, but which did not appear to my radiology consultant to contain the density, spickling (pointy margins), or central calcifications so often noted in breast cancers (although they can and do vary widely in appearance). The Monday post-prayer mammogram did appear normal.

During our telephone conversation, K.B. informed me that her saga actually began well before that December, when a routine mammogram revealed a lesion in her right breast (neither she nor any of her doctors, to her knowledge, have ever felt any "lump"). She was to have had a biopsy that July but "fainted" during the preliminary needle localization procedure, and the biopsy was canceled. The following is from the July 18, 1991, report (read to me by K.B. over the phone): " . . . Nodular density seen on outside [i.e., done elsewhere] mammogram performed last month, [here] for pre-operative needle localization today. . . . Today's [low dose mammography] again demonstrates a 1.0 cm noncalcified nodular density. . . ." (The report then describes the patient's fainting spell and the procedure's cancellation.)

A sonogram report dated November 8, 1991, notes comparison with "nodular density seen on outside mammogram of 4 October 91" and reveals " . . . a 5.0 x 3.0 mm somewhat rounded lesion [with] some degree of [internal] echogenicity [and] a second 6.0 mm somewhat oval-shaped lesion [also with] evidence of low-level echogenicity. . . . The walls [of both] are not well circumscribed. Impression: . . . two right breast lesions, neither of which have the sonographic criteria for cysts." This doesn't sound quite like what my colleague and I thought we saw on television, and the date of the report indicates that this sonogram was *not* performed on November 29. Further, the presence of more than one lesion within the breast is highly suggestive of a *benign* process. Although multiple *metastases* commonly result from the spread of a single breast cancer, it is exceedingly rare for multiple primary malignancies to arise within a breast or any other organ.

And from her December 2, 1991, post-prayer mammogram report: " . . . The right breast nodular density which had been reported on previous examinations is not definitely seen on today's examination . . . compared with the previous mammogram of 18 July and previous sonogram of 8 November. . . ." No mention was made of any mammogram or sonogram having been performed (perhaps elsewhere?) just three days earlier. And in none of K. B.'s reports are the findings said to be suspicious for malignancy, despite Stack's comment that her doctors "fear the worst—cancer."

Only after we said our farewells did I realize that the reports in K.B.'s possession fail to document any mammogram between October 4 and December 2, or any sonogram after November 8. However, K.B.'s name and "29 Nov" are faintly visible on the television show's sonogram—the one that seems to reveal a benign, fluid-filled *cyst* that could have resolved in a few days, or simply not have been visualized on the mammogram (cysts often aren't) of December 2. If a mammogram was also done on November 29, it was apparently unavailable both to "Unsolved Mysteries" and during her December 2 ordeal. The mammograms shown on television must have been those from December 2 and July 18—although no dates are visible, identical nameplates indicate a common facility, and the December 2 report notes only July 18 X rays as being available for comparison. Even if K.B. had a benign, solid fibroadenoma in her right breast in July, or even on November 8, there was ample time by December 2 for a nonmiraculous resolution.

K.B. would not reveal to me (nor have any other media been given permission by her to reveal) the names of her doctors and radiology facilities—

she says they want no related publicity. And because K.B. told me that she would never forgive me if I were to "ruin this very positive experience in my life," I have decided to use only her initials in this article, and to not call her back with my additional questions.

For K.B. there *are* no questions left unanswered. Besides "Unsolved Mysteries," she informed me that the story of her "healing" has appeared in *Good Housekeeping* magazine in an April 1993 article titled, "Do You Believe in Miracles?" and in Weiss's second "past lives" book, *Through Time into Healing* (she is referred to as "Frances"), as well as in a May 21, 1995, *Fort Lauderdale Sun-Sentinel* article. As K.B. said to me, "I am not a doctor and I don't care what the lumps were. I'm just glad they're gone. I believe God healed me."

—*Gary P. Posner*

Gary P. Posner, an internist in Tampa, Florida, is founder of the Tampa Bay Skeptics and a CSICOP Consultant.

A Suspicious Weeping Madonna in Italy

Italian media reported earlier this year that a mass-produced 17-inch-tall statue of the Madonna had wept tears of blood. The attention the media gave to this case, which at the beginning appeared as just one of the many reported all over Italy during the past two years, grew rapidly and pretty soon television news and the front pages of the newspapers gave daily reports on the developments.

It all began in Civitavecchia (a city near Rome) on February 16, 1995, when Fabio Gregori, an electrical worker and owner of the statue, declared that his daughter Jessica had spotted tears of blood running down the face of the statue of the Virgin Mary in his front yard. Gregori informed the local priest, and immediately thousands of pilgrims started visiting the statue, reporting that it continued weeping—although pictures taken at different times of the days did not show any changes in the bloodstains.

A church-appointed team conducted tests on the red substance, which turned out to be male human blood.

The city magistrate impounded and locked up the figurine. He also ordered another round of tests on the statue, including a DNA test to see if the tears matched blood of Gregori male family members. The order put a sudden halt to plans for a solemn Good Friday procession that was to transport the Madonna to a specially built chapel inside the nearby church of San Agostino. The Gregori family refused to subject the blood to the DNA tests.

The Vatican has so far maintained silence on the affair. But a bishop, who said he also saw the statue weep, is said to be furious at the implication that science is being used to measure the integrity of a man of God. "The blood is masculine," the bishop told the newspapers, "so it has to be the tears of Jesus"; it appears obvious that, had the blood turned out to be feminine, it would as well been declared a miracle, since the Madonna was a woman.

The Civitavecchia case has produced reams of commentary and theories: Sociologists talk about a "collective angst" produced by Italy's ongoing political crisis. Dacia Maraini, a well-known Italian writer, contends that the cult of the Madonna springs from an "archaic and irrational mentality," which fosters contempt of women. CICAP, the Italian skeptics committee, was daily asked by the media to comment on the case and suggest possible natural ways of producing the "miracle."

We explained that it was impossible to say what had actually happened since the phenomena occurred only before the owner of the statue. Immediately, bizarre theories, not subscribed to by CICAP, of remote-control devices or "special contact lenses that expand and release liquid when subjected to heat" began to circulate as possible explanations. When an X ray test of the statue proved it to be empty, and no other substances were found on the exterior of the statue, the failure of these explanations appeared clear and lent support to the claim that "science is unable to explain these phenomena."

Nobody seemed to have thought of the simplest of all explanations: The owner of the statue, in the comfort of his own home, could have taken some of his own blood and smeared it on the face of the statue. The claim of the bishop can't be validated, since, at that time, the statue had been left unattended in his house, where he also had three guests (one of which was a mystical seer).

The right thing to do, according to CICAP, would have been to immediately lock the statue in a transparent case, place in front of it a video camera, post a couple of persons as guards, and see if the weeping would have taken place. It is interesting to note that, while the statue was impounded by the magistrate, it never wept.

—*Massimo Polidoro*

Massimo Polidoro, magician and psychic investigator for CICAP (the Italian Committee for the Investigation of Claims of the Paranormal), has just published in Italy his first book: Viaggio tra gli spiriti, *a complete critical history of spiritualism.*

Seeking the Otherworldly at the Ozark UFO Convention

For the seventh time, the tiny hamlet of Eureka Springs, Arkansas, became the gathering place for the Ozark UFO Convention, the weekend of April 7-9, 1995. Lou Farrish was coordinator, host, and moderator to a group of speakers that included Michael Zimmerman, chairman of the Department of Philosophy at Tulane University, and Bruce Cornet, a New York University geologist. This year's theme seemed to revolve around the "other-dimensional" aspect of the UFO experience. It appears that proponents of UFOs are continuing their shift away from the nuts and bolts into the realm, in a lit-

eral sense, of dreams and archetypes. Very little was said of extraterrestrials visiting from faraway star systems. Instead, several of the presentations suggested that these aliens come from another plane or level of consciousness.

One of the more skewed talks of this nature came from Forrest Crawford, the Mutual UFO Network's (MUFON) Illinois representative. He listed ten or so ways of communicating "across the reality divide." Included as useful ways of communicating with entities on the other side are: mirror gazing, out-of-body experiences, hydromancing (liquid gazing), and alien channeling. Another of the more esoteric ideas came from a woman who claimed to have had a past life as an alien.

Karla Turner, abduction researcher and author of several books on the subject, spoke on "The UFO Masquerade." Her talk began with a basic, straightforward tale of aliens abducting women for physical examinations and probings. However, the field seems to be looking for more fertile territory in which to stimulate followers, who seemingly require a higher degree of strangeness each year. So, to add to the mystery, she said the U.S. military has joined in the abduction process (one would have thought they had learned their lesson after Operation Tailhook). Turner implicated the military in several cases she investigated. She concluded with a video taken by a woman who claims to be the victim of abduction by military agents. In the video were several shots of ordinary military aircraft that happened to be flying over her house. It was left to us to decide if this woman was being harassed by these aircraft. No evidence on the video indicated any malevolence by the aircraft toward the woman. Nonetheless, the audience could have been left with that impression since it was suggested by Turner.

Bruce Cornet gave two presentations. In the first, "Spaceship Moon," he claimed to have actual pictures of ancient lunar cities that now lie in ruins on the surface of the moon. One had to stretch one's own imagination, a.k.a. be moonstruck, to even assume this to be true. What he showed were photos of lunar landscapes, filled in and colored by his inventiveness. Taking a cue from Richard Hoagland (the "Face on Mars" guru), Cornet devised elaborate slants to the whole situation, creating wonderful architecture out of the craters and hills on the face of the moon. He obviously spent hours and hours fitting the illusory pieces together. His second presentation, "Pine Bush UFO," was more of the same. A tremendous amount of energy must have been spent building the logical framework on which his shaky premise served as a foundation. He was able to superimpose the infamous Martian area of Caldonia (an area of Mars that includes the well-recognized "Face") onto an area of Pine Bush, New York, matching three distinctive features common to both sites. Both areas, he claimed, have a hill and a crater in relatively the same location. He stated that the only remnant to match the infamous face in Pine Bush was an underground transmitter that was sending highly polarized energy into space! Pressed for details on the transmitters, he admitted to having no additional information on them.

Other speakers included Antonio Huneeus, UFO editor for *Fate* magazine, who gave an overview of UFO sightings in Eastern Europe and who actually came across rather nicely, leaving the more bizarre elements out of his talk. Linda Moulton Howe asked whether we are dealing with one intelligence that manifests itself in many ways—crops circles, cattle mutilations, abduction—or several different types of intelligence.

Sunday morning brought a potpourri of speakers in what was called the "Researchers' Mini-Session." Each was limited to a fifteen-minute presentation. Talks included news about a CD-ROM computer aid for UFO investigators, and a link between symptoms of Sudden Infant Death Syndrome (SIDS) and physical symptoms associated with abductees (the connection being dysfunction of the reticular system of the brain).

Noteworthy was speaker Randy Ortega, who presented new photos he took of UFOs near his home in central Illinois. The photos showed the typical streaks of light against a dark cloudy sky that are common to the UFO genre. But there was something about them that just didn't seem right. Ortega professed his ignorance about photography but was still peppered with questions on shutter speed, focal length, and film type. He was unable to answer

Drawing by Lorenz: © 1994. The New Yorker Magazine, Inc.

"You abducted him—<u>you</u> feed him."

W. Couch (University of New South Wales), R. Ellis (Cambridge University), and NASA

New Eye on Nature

This NASA Hubble Space Telescope image of the rich galaxy cluster, Abell 2218, is a spectacular example of gravitational lensing. The arclike pattern across the picture like a spider web is an illusion caused by the gravitational field of the cluster.

The cluster is so massive and compact that light rays passing through it are deflected by its enormous gravitational field, much as an optical lens bends light to form an image. The process magnifies, brightens, and distorts images of objects that lie far beyond the cluster. This provides a powerful "zoom lens" for viewing galaxies that are so far away they could not normally be observed with the largest available telescopes.

Hubble's high resolution reveals numerous arcs that are difficult to detect with ground-based telescopes because they appear to be so thin. The arcs are the distorted images of a very distant galaxy population extending 5 to 10 times farther than the lensing cluster. This population existed when the galaxy was just one quarter of its present age. The arcs provide a direct glimpse of how star-forming regions are distributed in remote galaxies, and other clues to the early evolution of galaxies.

Hubble also reveals multiple imaging, a rarer lensing event that happens when the distorted image is large enough to produce more than one image of the same galaxy. Abell 2218 has an unprecedented total of seven multiple systems.

The abundance of lensing features in Abell 2218 has been used to make a detailed map of the distribution of matter in the cluster's center. From this, distances can be calculated for a sample of 120 faint arclets found on the Hubble image. These arclets represent galaxies that are 50 times fainter than objects that can be seen with ground-based telescopes.

The image was taken with the Wide Field Planetary Camera 2.

as the congregation continued its friendly fire assault while scrutinizing the slides. Luckily an observant member of a dwindling audience suggested that the slide might be upside down. When turned around the scene was much easier to visualize. It was an underexposed picture of a cloudy sunset sky behind his treelined street. The trees were completely black but distinct as to their nature. What was once an unidentified light streak in the upper left-hand corner became an unidentified light source in the lower right-hand corner, at approximately street level (where cars drive with lights on or neighboring homes would be lit with outdoor decoration). Although it became apparent immediately as to what I was looking at, the rest of the crowd became still, hesitant to challenge a belief shared by all who were there. Where at one point they were attacking the validity of Ortega on his photographic prowess and the reality of the photos, they now sat in quiet retrospect. It was a UFO conference, and UFOs were what they came to see. When finished, Ortega left the podium to quiet applause.

—James R. Reich, Jr.

James R. Reich, Jr. is a toxicologist at the Office of the Medical Examiner in Cook County, Illinois. He wrote "The Eyewitness: Imperfect Interface Between Stimuli and Story" in our Summer 1993 issue.

Judge Overturns Conviction Based on 'Recovered Memories'

Use of "recovered memories" testimony in court was dealt a legal setback earlier this year. A federal judge in Oakland, California, reversed the murder conviction of a California man who had been found guilty in what news reports say was the first criminal prosecution based on "recovered memory" testimony.

U.S. District Judge Lowell Jensen of Oakland overturned the conviction of George Franklin, a San Mateo, California, firefighter whose daughter testified she had suddenly recalled seeing him kill her playmate 20 years earlier. Jensen ruled that the trial judge had barred Franklin's attorney from presenting evidence that Franklin's daughter, the sole witness against him, could have learned details of the 1969 murder from news articles about the murder and investigation and not from seeing him kill the victim.

Judge Jensen did not exclude recovered memories from trial evidence. But he said testimony based on recovered memories requires scrutiny. He gave prosecutors 90 days to retry or release Franklin, who is serving a life sentence.

In four more recent cases, judges have ruled that testimony based on repressed memories cannot be admitted at all. Two of the cases are criminal, two civil. According the *National Law Journal* (June 12, 1995), the cases appear to be the first in the United States in which the courts have made such pretrial rulings rather than letting a jury hear testimony.

In the most recent case, Judge William J. Groff of the Hillsborough Superior Court in Manchester, New Hampshire, found that "the phenomenon of memory repression and the process of therapy used in these cases to recover the memories have not gained general acceptance in the field of psychology and are not scientifically reliable."

He ruled in two consolidated cases in which women under therapy recalled alleged incidents of sexual abuse much earlier in their lives.

Fuzzy Logic

MARTIN GARDNER

When the prophet, a complacent
fat man,
Arrived at the mountain-top
He cried: "Woe to my knowledge!
I intended to see good white lands
And bad black lands,
But the scene is grey."

—Stephen Crane

Why does traditional logic have so little relevance to how we think? One reason is that, aside from terms in pure mathematics, formal logic, and some words in mathematical physics, almost all words have blurry boundaries. In set theory an element is either in or outside a set. In propositional calculus an assertion is either true or false. No in-betweens. Unfortunately, in the real world, as philosopher Charles Peirce observed, "All things swim in continua."

No sharp line divides day from night. Children grow imperceptibly into adults. Beasts evolved gradually into humans. Red fades into orange and into purple. When is a glass full? A banana ripe? A person rich? Is half an apple an apple? Is Japan a capitalist or socialist state? When is a novel obscene? Exactly what *is* a novel? Is a bar stool with a small back a chair? How can we measure the beauty of a poem, a painting, a melody, or a person?

Such vagueness must not be confused with ambiguity. "There is a bat in the attic" and Groucho Marx's "I shot an elephant in my pajamas" are ambiguous statements. Arguments over whether the moon rotates arise from the ambiguity of *rotate*. The moon rotates relative to the fixed stars, but not relative to Earth. By contrast, "Is there life on Mars?" is vague because "life" is vague. Are viruses alive? "Go wash your face" is vague. Does "wash" require soap? Are ears part of the face?

Problems in logic textbooks often involve such statements as, "If Bill is home, Mary is out." Is Mary home if she is in the garage or on a porch?

You might think that letters of the alphabet can be defined precisely. Far from it. Every letter can be gradually altered on a computer screen until it is any other letter, with unclassifiable intermediates. A well-known example:

THE CAT

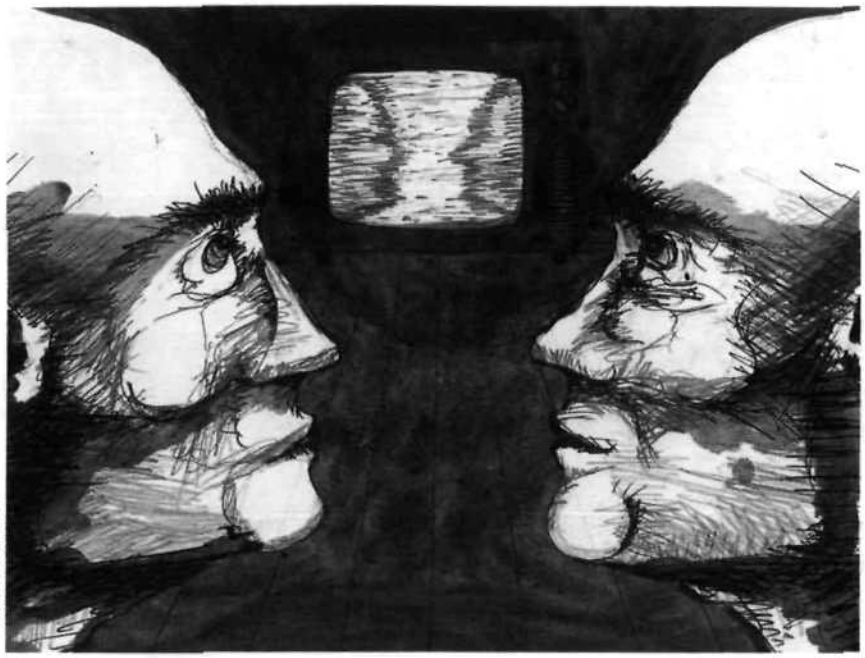
Is the middle symbol of each word an "A" or an "H"? Like so many words, the answer depends on the context. What is warm for an Eskimo may be cool to someone in the tropics. A small hippo is larger than a big ant. Jewelry expensive to a poor person is cheap to, say, Elizabeth Taylor or Donald Trump.

The ancient Greeks dramatized vagueness by the paradox of the heap. From a large heap of sand you remove one grain at a time. When does the heap cease to be a heap and become a few grains? How many is a "few"? How many hairs have to be missing from a man's head before he is bald?

From Aristotle on, logicians have, of course, been aware of vagueness and have proposed ways to overcome it. One way is to be more specific. Instead of vaguely declaring, "As someone once said, history is bunk," we specify it by saying, "As Henry Ford said in 1919. . . ." This helps, but still leaves "history" and "bunk" hopelessly vague.

Another way to avoid vagueness is to quantify. Vague words like *fast* and *slow* can be sharpened by saying that a car is going "too fast" on a thruway if its speed is more than 65 miles an hour, and going "too slow" if less than 40. Hot and cold can be made as crisp as you like by invoking degrees of temperature. Tall and short can be quantified with centimeters.

In recent decades logicians have tried to handle reasoning with vague terms by what are called "multi-valued logics." Instead of true and false, a three-value logic may introduce a third term such as *indeterminate*. Proposals



Patrick Hubenthal

have been made to apply three-value logics to quantum mechanics, where certain properties are unknowable. Modal logics distinguish between true, false, and possible. Hans Reichenbach and others have proposed multi-valued logics based on probabilities. True has a probability of 1, false a probability of 0. In between can be any number of truth values. Instead of saying vaguely that he or she thinks the big bang theory is true, a cosmologist would more accurately give the conjecture a subjective probability of, say, .9 of being true.

The latest, most ambitious, most radical effort to formalize reasoning with vague terms was named *fuzzy logic* by its inventor Lotfi Asker Zadeh, now a professor emeritus at the University of California, Berkeley. His new logic dates from 1965, when he published a little-noticed paper on *fuzzy sets.* (Zadeh was born Lotfi Aliaskerzadeh in Baku, Azerbaijan, in 1921, of a Russian mother and a Turkish-Iranian father. After graduating from the University of Teheran, he came to America and earned a doctorate in electrical engineering at Columbia University.)

Zadeh passionately believes that Aristotelian black-and-white logic is useless for reasoning about the real world. This view is shared by Alfred Korzybski, founder of *general semantics,* although this earlier movement by Korzybski had no influence on Zadeh. Just as firmly, Zadeh is convinced that fuzzy logic, with its tolerance of imprecision, will soon replace Aristotelian logic in a massive paradigm shift. "Nature," Zadeh is often quoted as saying, "writes with a spray can, not a ballpoint pen."

There is remarkable anticipation of fuzzy logic in H. G. Wells's philosophical work *First and Last Things* (1908). After describing a variety of objects called "chairs," he wrote: "In cooperation with an intelligent joiner I would undertake to defeat any definition of chair or chairishness that you gave me."

> Every species is vague, every term goes cloudy at its edges, and so in my way of thinking, relentless logic is only another name for stupidity—for a sort of intellectual pigheadedness. If you push a philosophical or metaphysical enquiry through a series of valid syllogisms—never committing any generally recognised fallacy—you nevertheless leave behind you at each step a certain rubbing and marginal loss of objective truth and you get deflections that are difficult to trace, at each phase in the process. Every species waggles about in its definition, every tool is a little loose in its handle, every scale has its individual.

Interest in fuzzy logic and fuzzy mathematics is now worldwide, but especially intense in China, Korea, and Japan. Fuzzy conferences are held regularly in the U.S., China, and Japan, where hundreds of fuzzy experts are publishing technical papers. Zadeh has become famous in Japan. More than a half-dozen introductory books on fuzzy logic are in Japanese. Technical books in English are finally being published, and several journals are devoted to this mushrooming field, the oldest being *Fuzzy Sets and Systems,* published in Amsterdam. The word *fuzzy* is on its cover in fuzzy red letters.

Every branch of applied mathematics has been fuzzified. Fuzzy arithmetic handles such fuzzy numbers as "almost 10" and "more than 50." Fuzzy geometry deals with almost straight lines, not quite round circles, and even vaguer concepts, such as ovals. Fuzzy graph theory draws graphs based on fuzzy points. There are fuzzy algebras, fuzzy topology, and fuzzy calculus. Work is being done on fuzzy artificial intelligence (AI), pattern recognition, and neural networks.

Fuzzy computer chips for handling fuzzy algorithms are rapidly being used in hundreds of control systems. In Japan, fuzzy silicon chips provide smooth stops and starts on Hitachi's subway in Sandai, Indonesia. The Japanese are fuzzifying elevators, cranes, washing machines, carburetors, showers, hair dryers, camcorders, electric razors, air conditioners, TV sets, ovens, vacuum cleaners, even entire chemical plants. "Expert systems," such as those used for medical diagnosis, mineral prospecting, and stock market analysis, are being fuzzified.

In 1989, the Japanese government funded the Laboratory for International Fuzzy Engineering Research with an advance of some $35 million and more than 40 member firms. Japanese cars are starting to use fuzzy transmissions. In 1989, Honda awarded its prestigious Honda prize to Zadeh for his contributions to Japanese technology. U.S. companies have been extremely reluctant to jump on the fuzzy bandwagon. Exceptions are Rockwell, which markets several fuzzy devices; Otis Elevator; and General Motors, which uses fuzzy logic in the transmission of its Saturn car.

Details of Zadeh's logic are technical, but let me convey some general features. A fuzzy set is one with fuzzy boundaries. Members are graded by a finite number of degrees, with incremental transitions between them. For example, heights of persons can be broken down into such fuzzy adjectives as very tall, tall, medium, short, and very short, each category defined by numerical intervals. A room's temperature is graded by numbers between hot and cold. True and false are replaced by degrees of truth and falseness. Although reasoning with fuzzy is precise, all its conclusions are fuzzy.

Many theorems in traditional logic carry over into fuzzy in modified ways. For example, on a scale of 0 to 1, assume that "Joe is short" has a fuzzy truth value of .2. Its complement, "Joe is not short," has a fuzzy value of 1 – .2 = .8. An "and" conjunction of "Joe is short" (value .2) with "Joe is handsome" (value .5) has a value of .5. "Joe is either short" or (in the exclusive sense) "Joe is handsome" has a value of .2. Implication: "If Joe is short then Joe is handsome" has a value equal to 1 – (.2 + .8), which is zero. Being short does not imply that one is handsome.

Instead of precise fuzzy values one might use what is called a "fuzzy fuzzy" value of, say, "almost .2." Zadeh calls such values a "second order of fuzziness."

"Fuzziness" is distinguished from "vagueness" in terms of (what else?) degree. "Jesus will return in a few years" is fuzzy. "Jesus will return eventually" is so extremely fuzzy that Zadeh calls it vague. He also distinguishes fuzzy from "probability" statements. "The chance it will rain tomorrow is .5" is a probability forecast. The fuzzy equivalent is, "The degree of truth that it will rain tomorrow is .5." The distinctions are subtle. Thus even the term *fuzzy* is "fuzzy."

Fuzzy logic, especially among artificial intelligence specialists in the U.S., has persistent detractors. They claim that fuzzy logic is overhyped, seeing it as a momentary fad similar to the "catastrophe theory" craze that befuddled mathematicians in the late 1970s. It has been called a "cult," with Zadeh as its founder and guru. Some have even called it "content free" and "the cocaine of science." Douglas Hofstadter thinks the idea of reasoning precisely about blurry concepts is "rather comical." Michael Arbib suggests that the cult would never have arisen if Zadeh had named his logic "set theory with degrees of membership."

Arguments between promoters and opponents of fuzzy have become acrimonious. In a 1994 conference on fuzzy in San Diego sponsored by *Computer Design* magazine, the main event was supposed to be a debate between fuzzian Earl Cox and antifuzzian Bob Pease. An announcement said the debate would be carefully monitored by the magazine's editor "to keep the contenders from doing each other actual harm." I am told the debate did not take place.

Opponents maintain that algorithms and chips based on probability theory and familiar multi-valued logics can do just as well as fuzzy in controlling machinery. After all, probability controls put astronauts on the moon, and guide intercontinental missiles and solar system probes. The line between fuzzy logic and probability logics is blurry. To assign "very tall" a fuzzy value of *n* is the same as saying that, in a given culture, a person over six feet will be called tall with a probability of *n*. Is fuzzy, detractors ask, merely probability theory in disguise?

To a large extent disagreements may be verbal. A computer program based on an analog algorithm with digital components would be called fuzzy by fuzzians, but not by others. Fuzzy chips, using sieves instead of on-off switches, would be called an analog program by the anti-fuzzians. Zadeh likes to point out that chess players have fuzzy intermediate goals, and when you park a car you maneuver it into fuzzy positions. Detractors would say that chess players and car parkers are simply making probability estimates.

In many cases, say the probabilists, a simple feedback mechanism, such as a flywheel or a thermostat, can serve adequately as a control mechanism. Fuzzy experts are proud of the fact that the Japanese have a fuzzy stability program that balances a pole on one end. Detractors say the same thing can be done with nonfuzzy programs. Fuzzians insist that fuzzy chips balance the pole, as well as handle other control systems, more efficiently with simpler rules and lower costs.

In 1993 two popular books on fuzzy logic were published in the U.S.: *Fuzzy Logic* (Simon and Schuster), by Daniel McNeil and Paul Freiberger, and *Fuzzy Thinking* (Hyperion) by Bart Kosko. Both books are breathless paeans to fuzzy, hailing it as a revolution of monumental proportions in computer technology—a revolution destined to transform the world.

Fuzzy Logic is the more restrained of the two. The authors give space to detractors, but argue that their opposition springs from a failure to understand fuzzy logic and from the slowness of a stubborn establishment to recognize a new paradigm shift. They agree with Zadeh that it will be many years until the U.S. catches up with Japanese technology in fuzzifying control systems. Although they are convinced that fuzziness will soon invade world technology, they grant the possibility that this prediction may "harden into garish embarrassments like the predictions of A.I. (artificial intelligence) and neural networks."

"Fuzzy arithmetic handles such fuzzy numbers as 'almost 10' and 'more than 50.'"

Bart Kosko, author of *Fuzzy Thinking,* is the movement's most controversial and combative promoter. He is the hero of the McNeil-Freiberger book, which devotes an entire chapter to him. Born in 1960 in Kansas City, Kansas, Kosko obtained his Ph.D. in 1987 from the University of California, San Diego, with a thesis on

Logic continued on page 56

Scientology vs. the Internet

ROBERT SHEAFFER

According to the copyrighted scriptures of the Church of Scientology, 75 million years ago a tremendous struggle took place among the 26 stars making up our local Galactic Federation. Faced with enormous overpopulation averaging 178 billion people per planet, federation leader Xenu had members of his Galactic Patrol (who dressed in white uniforms with silver boots) round up the surplus population. The surplus people were killed by an injection of glycol into the spinal cord; their bodies were frozen and loaded onto huge spaceships that look exactly like earthly DC-8s; and they were transported to Teegeeack—now known as planet Earth.

The bodies were piled on terrestrial mountaintops. Inside the mountains were 17 strategically placed hydrogen bombs of enormous power. After the blast, the "souls" of the dead—in Scientology parlance, the "thetans"—were electronically entrapped, gathered into clusters, and laboriously implanted with misguided ideas, morals, and feelings. Transported across the Earth's surface by glaciers, these clusters of disembodied galactic thetans are anxiously striving to get back into human bodies.

These "body thetans," whose millions-of-years-old thoughts and feelings impinge on our bodies, are responsible for most of the misery afflicting human life today.

There is but one way to get rid of thetans: The "clearing" process of Scientology, in which one clutches the celebrated "E-meter," while paying staggering sums of money in order to be asked dozens of questions about personal experiences going all the way back to childhood, and tens of millions of years before that.

However, this prehistoric battle of galactic thetans is nothing compared to the battle being waged in cyberspace between the Church of Scientology and its critics. A few years ago, a Usenet newsgroup called **alt.religion.scientology** was created and distributed over the Internet, the global "information superhighway." As one might imagine, such a newsgroup became a magnet for critics of Scientologists, making the church hierarchy see red.

Recently, certain hackers started posting to **alt.religion.scientology**—using various anonymous remailing systems (some of which the cyberpunks seem to have set up themselves)—the purported secret copyrighted "scriptures" of the Church of Scientology, heretofore available only to those who had purchased enough (about $250,000 worth) of "clearing" to achieve at least the rank of thetan. Instead of disavowing these corny texts, which read like bad science fiction, the Church of Scientology squealed like a stuck pig that its valuable copyrighted texts had been compromised and went on a crusade against its sometimes anonymous critics.

What happened next, and why, is rather confusing and highly controversial. Understanding it depends on whose account you choose to believe, with each side accusing the other of committing illegal acts. The Scientologists prevailed upon Interpol, the international police organization, to demand that a major Internet remailer in Finland divulge the identity of an individual who had made certain unwelcome attacks on the church, some of them apparently including quotes from Scientology founder and Chairman L. Ron Hubbard, and who seemed to know a lot about the church "operation."

Thus ordered, the remailer identified the anonymous contributor as somebody known only as "AB," who posted from an alumni account at California Institute of Technology in Pasadena. This is the first time that an Internet anonymous remailer has clashed with the law—and the remailer lost. AB has since disappeared from the Internet. His or her unpardonable offense seems to

have been to post knowledgeably about the incident involving "Miss Bloody," a mysterious woman in a bar allegedly claiming to be an IRS agent investigating Scientology, who began conversing with Tom Klemesrud, operator of a computer Bulletin Board system from which much information highly unwelcome to Scientology made its way onto the Internet. Afterward, at his apartment, Klemesrud claims that he caught her spreading blood all around and that, fearing he was being "set up" for a criminal charge, he called the police. The account of the woman—whose identity remains unknown to this day—is that Klemesrud threatened her with a shotgun, and that the blood all over the bathroom and bedroom came from her hemorrhoids. As usually happens in a dispute of this type, he went off to jail, while she went free. He posted bond the next morning—but she has never been seen again! One of the most prominent users of Klemesrud's Bulletin Board system was Dennis Erlich of Glendale, California, a former minister of Scientology who left the church in 1982, and who is now one of the church's leading critics. The Church of Scientology, alleging copyright violations, obtained an order from the U.S. District Court in San Francisco to raid Erlich's home, seize his computer, diskettes, and files (the authorities even inexplicably took hair samples from his bathroom sink). A trial is scheduled for 1996.

Erlich is being defended by the Electronic Frontier Foundation, a group devoted to preserving freedom of speech in cyberspace (see its Internet World Wide Web home page at **http://www.eff.org**). Erlich claims his excerpts from Hubbard's writings are covered under the provisions of "fair use" for discussion and commentary, and that his freedom of religion is being abridged by a restraining order directing him to refrain from quoting any of Scientology's texts.

Helena Kobrin, an attorney representing the Church of Scientology, logging onto **netcom.com**, a major Internet access site in Silicon Valley, sent out messages to network system administrators worldwide requesting that they remove

Gerald Fried

the entire newsgroup **alt.religion.scientology**. The rationalization for this was that, (*a*) the newsgroup had been the vehicle for illegal posting of copyrighted material, and (*b*) the name "Scientology" was trademarked. The appeal went unheeded, and the critics of Scientology charged that the real motivation was to attempt to suppress all criticism of the Church of Scientology in cyberspace.

Had this unprecedented "remove group" effort succeeded, somebody would have immediately created **alt.fan.l-ron-hubbard** where the critics of Scientology would once again congregate. The raid served only to inflame the critics of Scientology, and the same embarrassing "secrets" that were intended to be silenced became more widely read on-line than ever before. Other postings to **alt.religion.scientology** contained the texts of affidavits from ex-Scientologists filed in ongoing lawsuits against the church, and detailed allegations of unethical and possibly illegal behavior on the part of church officials.

Sensing that the church's battle was being lost, someone sympathetic to Scientology began forging "cancel" commands for certain Internet postings offensive to the church. Cancellations normally can be done only by the author of a post, but it is not difficult for unscrupulous hackers to cancel other people's postings. To combat this, Homer W. Smith created the Lazarus System, an ingenious Internet program to generate warnings about spurious cancellations and enable the cancelled messages to be resurrected. Such messages were invariably found to be highly critical of the Church of Scientology.

Meanwhile, many lawsuits are pending against the church, and critics of Scientology claim that the church's leader, David Miscavige, is hiding out in one of the church's vast compounds to avoid service of subpoenas and additional lawsuits. A litigant who won an award of $2.5 million from the church, which he is now trying to collect, offers a reward of $3,000 to anyone who can serve Miscavige.

At least one affidavit alleges that the church is stockpiling unregistered weapons, like the Branch Davidians, anticipating a possible raid by law enforcement officials.

Meanwhile, a dissident Scientologist in Germany named Koos Nolst Trenite claims to be in touch with the operational thetan of Scientology's founder L. Ron Hubbard. The thetan has been wandering freely in Scientology-space since it discarded its earthly body in 1986. This makes Trenite the rightful spiritual leader of Scientologists everywhere (or so he believes), and he freely proclaims Hubbard's views on all the important contemporary issues. Because Trenite has nobody to hook up to his E-meters, he has been auditing prominent Scientologists and ex-Scientologists telepathically. □

Telephone Psychics: Friends or Phonies?

C. EUGENE EMERY, JR.

The half-hour commercial on television stations throughout the country tells the story of a man named "Giacomo," who became a regular customer of the Psychic Friends Network after "Shekhinah," one of its seers, supposedly helped him find a missing address book.

After two months of additional phone advice from Shekhinah, she advised him to avoid an important business meeting. "I see darkness and destruction," the commercial quotes Giacomo's psychic friend as saying. "Whatever you do, don't go to this meeting."

So instead of attending the meeting, Giacomo went to visit his parents and friends in New Jersey. It was on the day (February 26, 1993) terrorists detonated a bomb in the World Trade Center in New York City. In the commercial, Giacomo says the business meeting he was supposed to attend was held in the New York Vista Hotel in the World Trade Center.

"That call," he says, "saved my life."

Giacomo's testimonial is followed by the assurances of Grammy-award-winning singer Dionne Warwick that when you call the Psychic Friends Network "You can be sure you're talking to one of the best psychics on earth. . . . Our psychics have the answers."

"Joan Cook" (who asked that her real name not be used), of Broomfield, Colorado, says she's seen a different side of the Psychic Friends Network, run by Inphomation Inc. of Baltimore, Maryland. For about six months, beginning in November 1991, when the network was calling itself "Professional Psychic Counselors," Cook was one of its counselors.

She said she is no psychic. She was recommended for the job by her teacher in a counseling class, who said Cook would be free to do traditional counseling on the network.

But she quickly discovered that her callers didn't want basic, commonsense advice. They wanted supernatural insights.

When women called to ask if they were pregnant, Cook tried to get them to contact their local chapter of Planned Parenthood for a pregnancy test. Most rejected her advice. They "weren't about to do something so cheap and commonsense *unless* I told them I read in the cards that the cards said they should go to the doctor and get their health checked out," she said.

According to Cook, one of her callers, who refused to accept his divorce, violated a restraining order on the advice of a psychic on the hot line. He was arrested. He said he was calling from jail.

Cook said: "When I told him to discount everything the previous 'psychic friend' had told him, he wasn't buying it at all. [It wasn't] *until* I told him I had read in the cards that the previous psychic had made a terrible mistake in computing his astrological chart because of a power failure that had damaged her equipment with a power surge, [only] *then* was he willing to take my advice, the advice of his personal counselor, his mother, *and* the prison chaplain" to read and abide by the restraining order.

There was the January 8, 1992, call from someone who identified herself as Tonia in Winston-Salem, North Carolina. Tonia wanted to know whether her husband was going to beat her. Cook tried to convince her to call the emergency number 911. She also gave Tonia the names of churches that might provide counseling. The woman's reaction: "I called for a *reading*. I want my *reading!*" So, Cook says, she concocted a tarot reading to back up her recommendation.

"Only when Tonia was thoroughly convinced the advice came from the cards and not just some ordinary individual did she seem inclined to access the *free* resources *already* available to her in her *own* community," Cook explained.

Why was Tonia's husband so angry? Cook says he had discovered that Tonia

James Becker

had racked up a $5,000 phone bill talking to "psychic" counselors.

Dionne Warwick and the other promoters of the Psychic Friends Network tell potential customers that, to benefit from the hot line, "all it takes is a telephone and an open mind."

They neglect to mention money—lots of money.

At four dollars a minute, an hour with a Psychic Friends Network psychic, astrologer, tarot-card reader, dream interpreter, past-life reader, ghost buster, or animal psychic will cost a whopping $240.

Gene Emery is the science writer for the Providence Journal-Bulletin, *75 Fountain St., Providence, RI 02902.*

But Cook said a good chunk of callers' phone time wasn't even spent on talking to such seers.

When customers called the hot line, she said, they first had to listen to a three-minute introduction. Then the hot line would begin playing recorded profiles of various psychics so customers could choose one. People who knew the code number for their favorite psychic could skip that part.

If the phone line of the psychic the customer wanted to talk to was busy, or if the psychic was off duty, the customer was stuck with the cost of listening to the introduction.

Callers were then asked to sign up for a free newspaper, which also ate up phone time. "So the average caller may well have spent over $24 by the time the formalities associated with the free newspaper were dispensed with," said Cook.

(The three-minute introduction Cook talks about is no longer there. When I called Psychic Friends Network on May 14, 1995, I got through to the next available psychic in a little less than a minute. But while some hot lines wait two minutes or so to begin charges, charges on the Psychic Friends Network kicked in after a rapid-fire 17-second introduction.)

The psychics are paid well, but receive only a fraction of what the service gets. Cook said that when she was on the network the pay was as much as

$18 an hour. Psychic Shari Ford, quoted in an April 16, 1995, article in the *Milwaukee Journal Sentinel,* said she earned $24 an hour at the same network.

But the seers, who work from various cities, and from their own homes, had to buy their own phone line and use it exclusively for the hot line. They used an 800-number (toll free) and a password to signal a central computer that they were ready to take calls.

Cook said many times the network was so busy she had trouble finding a spare moment to call Inphomation Inc. to give the code to go off duty. The instant she hung up the phone, it would ring again with the voice of a new caller seeking advice.

Her stint on the service ended abruptly, Cook says, after she got a call from Inphomation complaining that she was telling people where to get free advice, she complained about the content of some of the network's advertisements, and gave a newspaper interview for an exposé about the hot line.

Robert Hoffmann, Inphomation's senior vice president for business affairs, said consumers are well aware of the price of the call, and most callers who telephone the network and its stable of about 1,500 psychics do it for the entertainment value. He declined to give a breakdown of how much of the $240 an hour is profit.

Although there are psychics from the network in my area, he declined to make any available for an in-person interview.

Psychics who work for another psychic network that includes the Philip Michael Thomas Network and the ASA Network, also must pay for their own phone line.

Readers on this network spend part of their time as psychics and part doing telemarketing for the company, according to a contract sent to one prospective psychic from the parent company, Psychic Readers Network Inc. (PRN) of Ft. Lauderdale, Florida.

Under the system in use last May, if the psychic hears five or six fast beeps at the start of the call, he or she uses a script for the ASA Network. One long, low-pitched buzz means the psychic must use the telemarketing script for the Philip Michael Thomas Network.

Both scripts, for people who have dialed an 800-number (toll free) to inquire about the service, require the psychic to entice each caller by saying: "We have good news and important information you need to know that may be critical to your future."

Only after the callers give their name, address, and home phone number are they given a 900-number to call at $3.99 a minute. Beginning psychics make 25 cents a minute, get no benefits, can be fired for almost any reason, and must make a toll call to Florida every day to relay the information they've collected from their clients.

"One self-proclaimed psychic I know who auditioned for the network said she was told by a company representative that psychic abilities didn't really matter."

(Peter Stoltz, a manager at PRN, said the hot line's psychics get roughly 10 cents of every dollar the company charges; the phone company gets 25 cents; 30 cents goes to advertising and promotion; and 30 cents is lost when customers refuse to pay.)

As for the readings themselves, the psychics are instructed to first get the client's name, birth date, and address, then instruct the client to write down and think about any questions he or she may have. "Do not ask for their specific questions or for the reason they called until after you give them a complete general reading!" according to PRN's guidelines for psychic advisers. "This is necessary for accuracy and to tune into their aura and energy," the guidelines continue.

Stoltz said the intent is not to rack up the per-minute charges. "To be accurate, you need to do a little work tuning in." He compared a psychic who does a quick reading to a doctor who tries to diagnose a medical problem from across the room.

The advisers are also told to "give positive and complete readings with lots of interesting detailed information."

Warnings about impending crises or accounts of doom and gloom are discouraged, said Stoltz. "Let's face it, it could be wrong. We don't want to tell them they're going to die or they should get a divorce. It's not our place to give people that kind of dire advice when there's always a margin of error."

According to documents sent to prospective psychics, about five to nine minutes into the reading, the psychics are supposed to ask callers if they've signed up for the Philip Michael Thomas Network Psychic Membership Club. If not, they're supposed to launch into yet another sales pitch, this time at the customer's expense.

The guidelines also tell the readers, "You can go to a maximum 30 to 38 minutes, and before being cut off, you will hear a warning beep about two minutes before."

Stoltz said such cutoffs are designed to prevent a phone bill from getting so high the customer won't want to pay it. The system blocks people from calling the service too many times or for too many minutes in a single day. There is also a limit on the number of minutes a month that can be charged to a single number.

Despite the scripted sales pitches and the rule about giving positive readings, the psychics are required to sign contracts affirming that PRN "is not providing (the psychic) with any prepared text, script or statements to be used." The contract also makes the psychic agree to absolve PRN of all responsibility for any information given in the reading.

As for the abilities of network psychics, they apparently only have to affirm that they have such talents. One self-proclaimed psychic I know who auditioned for the network said she was

told by a company representative that psychic abilities didn't really matter.

PRN's Stoltz said the audition usually consists of giving an impromptu reading for a staff member over the phone. They aren't asked to do something more concrete, like picking a lottery number, because "nobody can pick a number that will hit. If they could, what would they be doing working for us for 40 cents a minute?"

Hoffman of Inphomation said the psychics on the Psychic Friends Network are carefully selected and extensively screened by other psychics. Only one in five applications are accepted.

"A person who is skeptical might turn around and say [the person giving a successful reading] just had good intuition. They're a good judge of people. They are very wise in the way things usually work in the world. There's nothing supernatural about it," said Stoltz. "The argument about whether it comes from a honed, human skill or from a supernatural or spiritual place is an argument that will be going on for eternity."

However they do it, Stoltz said, the people who work on the hot line must try to do their divinations by some supernatural means, be it astrology, tarot cards, or raw psychic power. "We're not a counseling line."

Last January, the Tennessee Attorney General's Division of Consumer Affairs negotiated an agreement with Inphomation Inc. The attorney general alleged that:

- Calls were lengthened by a recording detailing the "credentials" of each "psychic."
- Calls contained long pauses, repetitive information, and information that seemed to have been dragged out.
- People who called to speak to a particular "psychic" who was unavailable were charged for their time on the 900-number.
- People were abruptly disconnected during their reading.

As part of the settlement, Inphomation agreed to reimburse or credit the accounts of all Tennessee consumers who complained within 90 days after the settlement was approved in court. Inphomation also agreed to clearly and conspicuously disclose its refund policy, which says that if repeat customers discover that the psychic they want is unavailable, they will get a complimentary psychic reading or a credit for the full cost of the call, if they complain.

Hoffman, however, said there "was no settlement" and that the attorney general's office was "very satisfied with the way we were conducting business."

The media have done occasional exposés of the psychic hot lines. About three years ago, for example, the ABC-TV program "PrimeTime Live" arranged to have a college student with no psychic ability hired by one of the services.

But many other programs focus only in a cursory manner on the thousands of dollars people spend on telephone psychics. As SKEPTICAL INQUIRER readers are aware, many attempts to scientifically prove the existence of such psychic powers have failed. Yet the media seldom make any effort to determine if any of the psychics on these hot lines have any real psychic talent.

On the August 17, 1994, Bertice Berry television program on "Psychic Swindlers," panelists told plenty of horror stories. But, at the beginning of the syndicated talk show, Berry promised her audience that "we're going to talk to some people later on who will tell you how, if you're going to go to a psychic, to find a proper one." As far as the hostess was concerned, psychics with real powers are out there.

Viewers of the May 4, 1995, "Charles Perez Show" saw the usual collection of people addicted to the lines, but Perez also featured "Marie," who tearfully complained that when a psychic wrongly told her that her fiancé was cheating on her, her relationship was "almost ruined."

When Perez got hot-line psychic Julie Williams of PRN to demonstrate her powers by giving a reading to a young woman in the audience, Williams said the woman's boyfriend wasn't really right for her. Williams's reading brought tears to the woman's eyes. It was precisely the type of thing Marie had just accused a phone psychic of doing to her. "See what I mean, Charles?" Marie quietly told Perez.

Perez said he understood, but added, "We are in no position to say [Williams] is not legitimate."

Wrong. There are plenty of tests a talk show can conduct to indicate whether a psychic has real powers. A random audience member receiving a psychic reading is not one of them.

Because of their popularity and profitability, the psychic hot lines are likely to be with us for a long time.

Despite the stories about rip-offs and bogus psychics, believers will always rationalize that *their* psychic can really see the future.

And all it takes is a good, dramatic hit to hook a customer for a long time. (Giacomo may believe that his psychic friend saved his life, but a hotel spokeswoman said nobody in the hotel he was planning to visit was killed, none of the guests was seriously injured, and the significant damage was confined to the unoccupied Liberty ballroom and the B-1 level, which houses accounting, housekeeping, and human services.)

PRN manager Peter Stoltz recalls, "We did actually try to start a psychology line for people who maybe didn't believe in psychics." In creating the Professional Advisers Network two years ago he said, "We hired a hundred psychologists, psychotherapists and psychiatrists on the same work-at-home-on-the-phone basis. We ran ads. The phones did not ring. Not at all," he said. "If people want something a little more magical and a little more spiritual, fine. Obviously they must be getting something out of it."

Cook, a counselor now retired from Inphomation's hot line, said that although "the sort of superstition these people are promoting is dangerous beyond belief, I will have to admit one thing: I got paid better at that job than at any other job I ever had before or since. Isn't it too bad that people pay legitimate counselors so poorly, but will shovel millions of dollars into hands of quacks like that." □

The Paradox of Knowledge

LEE LOEVINGER

As knowledge about nature expands, so does ignorance, and ignorance may increase more than its related knowledge.

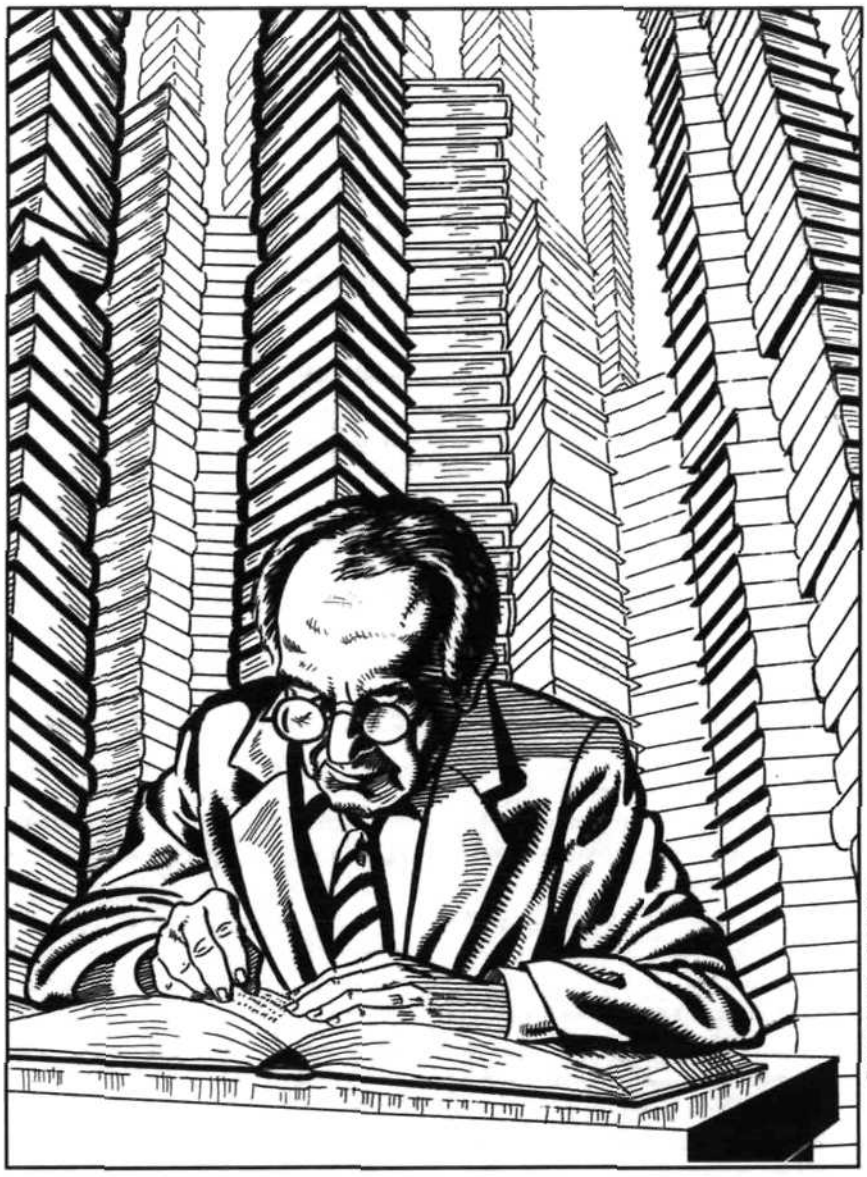
The greatest achievement of humankind in its long evolution from ancient hominoid ancestors to its present status is the acquisition and accumulation of a vast body of knowledge about itself, the world, and the universe. The products of this knowledge are all those things that, in the aggregate, we call "civilization," including language, science, literature, art, all the physical mechanisms, instruments, and structures we use, and the physical infrastructures on which society relies. Most of us assume that in modern society knowledge of all kinds is continually increasing and the aggregation of new information into the corpus of our social or collective knowledge is steadily reducing the area of ignorance about ourselves, the world, and the universe. But continuing reminders of the numerous areas of our present ignorance invite a critical analysis of this assumption.

In the popular view, intellectual evolution is similar

to, although much more rapid than, somatic evolution. Biological evolution is often described by the statement that "ontogeny recapitulates phylogeny"—meaning that the individual embryo, in its development from a fertilized ovum into a human baby, passes through successive stages in which it resembles ancestral forms of the human species. The popular view is that humankind has progressed from a state of innocent ignorance, comparable to that of an infant, and gradually has acquired more and more knowledge, much as a child learns in passing through the several grades of the educational system. Implicit in this view is an assumption that phylogeny resembles ontogeny, so that there will ultimately be a stage in which the accumulation of knowledge is essentially complete, at least in specific fields, as if society had graduated with all the advanced degrees that signify mastery of important subjects.

Such views have, in fact, been expressed by some eminent scientists. In 1894 the great American physicist Albert Michelson said in a talk at the University of Chicago:

> While it is never safe to affirm that the future of Physical Science has no marvels in store even more astonishing than those of the past, it seems probable that most of the grand underlying principles have been firmly established and that further advances are to be sought chiefly in the rigorous application of these principles to all the phenomena which come under our notice. . . . The future truths of Physical Science are to be looked for in the sixth place of decimals.



Brad Marshall, After Eakins

In the century since Michelson's talk, scientists have discovered much more than the refinement of measurements in the sixth decimal place, and none is willing to make a similar statement today. However, many still cling to the notion that such a state of knowledge remains a possibility to be attained sooner or later. Stephen Hawking, the great English scientist, in his immensely popular book *A Brief History of Time* (1988), concludes with the speculation that we may "discover a complete theory" that "would be the ultimate triumph of human reason—for then we would know the mind of God." Paul Davies, an Australian physicist, echoes that view by suggesting that the human mind may be able to grasp some of the secrets encompassed by the title of his book *The Mind of God* (1992). Other contemporary scientists write of "theories of everything," meaning theories that explain all observable physical phenomena, and Nobel Laureate Steven Weinberg, one of the founders of the current standard model of physical theory, writes of his *Dreams of a Final Theory* (1992).

Despite the eminence and obvious yearning of these and many other contemporary scientists, there is nothing in the history of science to suggest that any addition of data or theories to the body of scientific knowledge will ever provide answers to all questions in any field. On the contrary, the history of science indicates that increasing knowledge brings awareness of new areas of ignorance and

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of new questions to be answered.

Astronomy is the most ancient of the sciences, and its development is a model of other fields of knowledge. People have been observing the stars and other celestial bodies since the dawn of recorded history. As early as 3000 B.C. the Babylonians recognized a number of the constellations. In the sixth century B.C., Pythagoras proposed the notion of a spherical Earth and of a universe with objects in it that moved in accordance with natural laws. Later Greek philosophers taught that the sky was a hollow globe surrounding the Earth, that it was supported on an axis running through the Earth, and that stars were inlaid on its inner surface, which rotated westward daily. In the second century A.D., Ptolemy propounded a theory of a geocentric (Earth-centered) universe in which the sun, planets, and stars moved in circular orbits of cycles and epicycles around the Earth, although the Earth was not at the precise center of these orbits. While somewhat awkward, the Ptolemaic system could produce reasonably reliable predictions of planetary positions, which were, however, good for only a few years and which developed substantial discrepancies from actual observations over a long period of time. Nevertheless, since there was no evidence then apparent to astronomers that the Earth itself moves, the Ptolemaic system remained unchallenged for more than 13 centuries.

In the sixteenth century Nicolaus Copernicus, who is said to have mastered all the knowledge of his day in mathematics, astronomy, medicine, and theology, became dissatisfied with the Ptolemaic system. He found that a heliocentric system was both mathematically possible and aesthetically more pleasing, and wrote a full exposition of his hypothesis, which was not published until 1543, shortly after his death. Early in the seventeenth century, Johannes Kepler became imperial mathematician of the Holy Roman Empire upon the death of Tycho Brahe, and he acquired a collection of meticulous naked-eye observations of the positions of celestial bodies that had been made by Brahe. On the basis of these data, Kepler calculated that both Ptolemy and Copernicus were in error in assuming that planets traveled in circular orbits, and in 1609 he published a book demonstrating mathematically that the planets travel around the sun in elliptical orbits. Kepler's laws of planetary motion are still regarded as basically valid.

In the first decade of the seventeenth century Galileo Galilei learned of the invention of the telescope and began to build such instruments, becoming the first person to use a telescope for astronomical observations, and thus discovering craters on the moon, phases of Venus, and the satellites of Jupiter. His observations convinced him of the validity of the Copernican system and resulted in the well-known conflict between Galileo and church authorities. In January 1642 Galileo died, and in December of that year Isaac Newton was born. Modern science derives largely from the work of these two men.

Newton's contributions to science are numerous. He laid the foundations for modern physical optics, formulated the basic laws of motion and the law of universal gravitation, and devised the infinitesimal calculus. Newton's laws of motion and gravitation are still used for calculations of such matters as trajectories of spacecraft and satellites and orbits of planets. In 1846, relying on such calculations as a guide to observation, astronomers discovered the planet Neptune.

While calculations based on Newton's laws are accurate, they are dismayingly complex when three or more bodies are involved. In 1915, Einstein announced his theory of general relativity, which led to a set of differential equations for planetary orbits identical to those based on Newtonian calculations, except for those relating to the planet Mercury. The elliptical orbit of Mercury rotates through the years, but so slowly that the change of position is less than one minute of arc each century. The equations of general relativity precisely accounted for this precession; Newtonian equations did not.

Einstein's equations also explained the red shift in the light from distant stars and the deflection of starlight as it passed near the sun. However, Einstein assumed that the universe was static, and, in order to permit a meaningful solution to the equations of relativity, in 1917 he added another term, called a "cosmological constant," to the equations. Although the existence and significance of a cosmological constant is still being debated, Einstein later declared that this was a major mistake, as Edwin Hubble established in the 1920s that the universe is expanding and galaxies are receding from one another at a speed proportionate to their distance.

Another important development in astronomy grew out of Newton's experimentation in optics, beginning with his demonstration that sunlight could be broken up by a prism into a spectrum of different colors, which led to the science of spectroscopy. In the twentieth century, spectroscopy was applied to astronomy to gain information about the chemical and physical condition of celestial bodies that was not disclosed by visual observation. In the 1920s, precise photographic photometry was introduced to astronomy and quantitative spectrochemical analysis became common. Also during the 1920s, scientists like Heisenberg, de Broglie, Schrödinger, and Dirac developed quantum mechanics, a branch of physics dealing with subatomic particles of matter and quanta of energy. Astronomers began to recognize that the properties of celestial bodies, including planets, could be well understood only in terms of physics, and the field began to be referred to as "astrophysics."

These developments created an explosive expansion in our knowledge of astronomy. During the first five thousand years or more of observing the heavens, observation was confined to the narrow band of visible light. In the last half of this century astronomical observations have been made across the spectrum of electromagnetic radiation, including radio waves, infrared, ultraviolet, X-rays, and gamma rays, and from satellites beyond the atmosphere. It is no exaggeration to say that since the end of World War II more astronomical data have been gathered than during all of the thousands of years of preceding human history.

However, despite all improvements in instrumentation, increasing sophis-

tication of analysis and calculation augmented by the massive power of computers, and the huge aggregation of data, or knowledge, we still cannot predict future movements of planets and other elements of even the solar system with a high degree of certainty. Ivars Peterson, a highly trained science writer and an editor of *Science News*, writes in his book *Newton's Clock* (1993) that a surprisingly subtle chaos pervades the solar system. He states:

> In one way or another the problem of the solar system's stability has fascinated and tormented astronomers and mathematicians for more than 200 years. Somewhat to the embarrassment of contemporary experts, it remains one of the most perplexing, unsolved issues in celestial mechanics. Each step toward resolving this and related questions has only exposed additional uncertainties and even deeper mysteries.

Similar problems pervade astronomy. The two major theories of cosmology, general relativity and quantum mechanics, cannot be stated in the same mathematical language, and thus are inconsistent with one another, as the Ptolemaic and Copernican theories were in the sixteenth century, although both contemporary theories continue to be used, but for different calculations. Oxford mathematician Roger Penrose, in *The Emperor's New Mind* (1989), contends that this inconsistency requires a change in quantum theory to provide a new theory he calls "correct quantum gravity."

Furthermore, the observations astronomers make with new technologies disclose a total mass in the universe that is less than about 10 percent of the total mass that mathematical calculations require the universe to contain on the basis of its observed rate of expansion. If the universe contains no more mass than we have been able to observe directly, then according to all current theories it should have expanded in the past, and be expanding now, much more rapidly than the rate actually observed. It is therefore believed that 90 percent or more of the mass in the universe is some sort of "dark matter" that has not yet been observed and the nature of which is unknown. Current theories favor either WIMPs (weakly interacting massive particles) or MACHOs (massive compact halo objects). Other similar mysteries abound and increase in number as our ability to observe improves.

The progress of biological and life sciences has been similar to that of the physical sciences, except that it has occurred several centuries later. The theory of biological evolution first came to the attention of scientists with the publication of Darwin's *Origin of Species* in 1859. But Darwin lacked any explanation of the causes of variation and inheritance of characteristics. These were provided by Gregor Mendel, who laid the mathematical foundation of genetics with the publication of papers in 1865 and 1866.

Medicine, according to Lewis Thomas, is the youngest science, having become truly scientific only in the 1930s. Recent and ongoing research has created uncertainty about even such basic concepts as when and how life begins and when death occurs, and we are spending billions in an attempt to learn how much it may be possible to know about human genetics. Modern medicine has demonstrably improved both our life expectancies and our health, and further improvements continue to be made as research progresses. But new questions arise even more rapidly than our research resources grow, as the host of problems related to the Human Genome Project illustrates.

From even such an abbreviated and incomplete survey of science as this, it appears that increasing knowledge does not result in a commensurate decrease in ignorance, but, on the contrary, exposes new lacunae in our comprehension and confronts us with unforeseen questions disclosing areas of ignorance of which we were not previously aware.

Thus the concept of science as an expanding body of knowledge that will eventually encompass or dispel all significant areas of ignorance is an illusion. Scientists and philosophers are now observing that it is naive to regard science as a process that begins with observations that are organized into theories and are then subsequently tested by experiments. The late Karl Popper, a leading philosopher of science, wrote in *The Growth of Scientific Knowledge* (1960) that science starts from problems, not from observations, and that every worthwhile new theory raises new problems. Thus there is no danger that science will come to an end because it has completed its task, thanks to the "infinity of our ignorance."

At least since Thomas Kuhn published *The Structure of Scientific Revolutions* (1962), it has been generally recognized that observations are the result of theories (called paradigms by Kuhn and other philosophers), for without theories of relevance and irrelevance there would be no basis for determining what observations to make. Since no one can know everything, to be fully informed on any subject (a claim sometimes made by those in authority) is simply to reach a judgment that additional data are not important enough to be worth the trouble of securing or considering.

To carry the analysis another step, it must be recognized that theories are the result of questions and questions are the product of perceived ignorance. Thus it is that ignorance gives rise to inquiry that produces knowledge, which, in turn, discloses new areas of ignorance. This is the paradox of knowledge: As knowledge increases so does ignorance, and ignorance may increase more than its related knowledge.

My own metaphor to illustrate the relationship of knowledge and ignorance is based on a line from Matthew Arnold: "For we are here as on a darkling plain. . . ." The dark that surrounds us, that, indeed, envelops our world, is ignorance. Knowledge is the illumination shed by whatever candles (or more technologically advanced light sources) we can provide. As we light more and more figurative candles, the area of illumination enlarges; but the area beyond illumination increases geometrically. We know that there is much we don't know; but we cannot know how much there is that we don't know. Thus knowledge is finite, but ignorance is infinite, and the finite cannot ever encompass the infinite.

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Consciousness as a Valid Subject for Scientific Investigation

HUNTLEY INGALLS

Two behaviorists pass on the sidewalk and one says to the other, "You feel fine this morning. How do I feel?"

Recent advances in brain research have stimulated widespread interest throughout the scientific community in the nature of consciousness, lending new respectability to the subject.

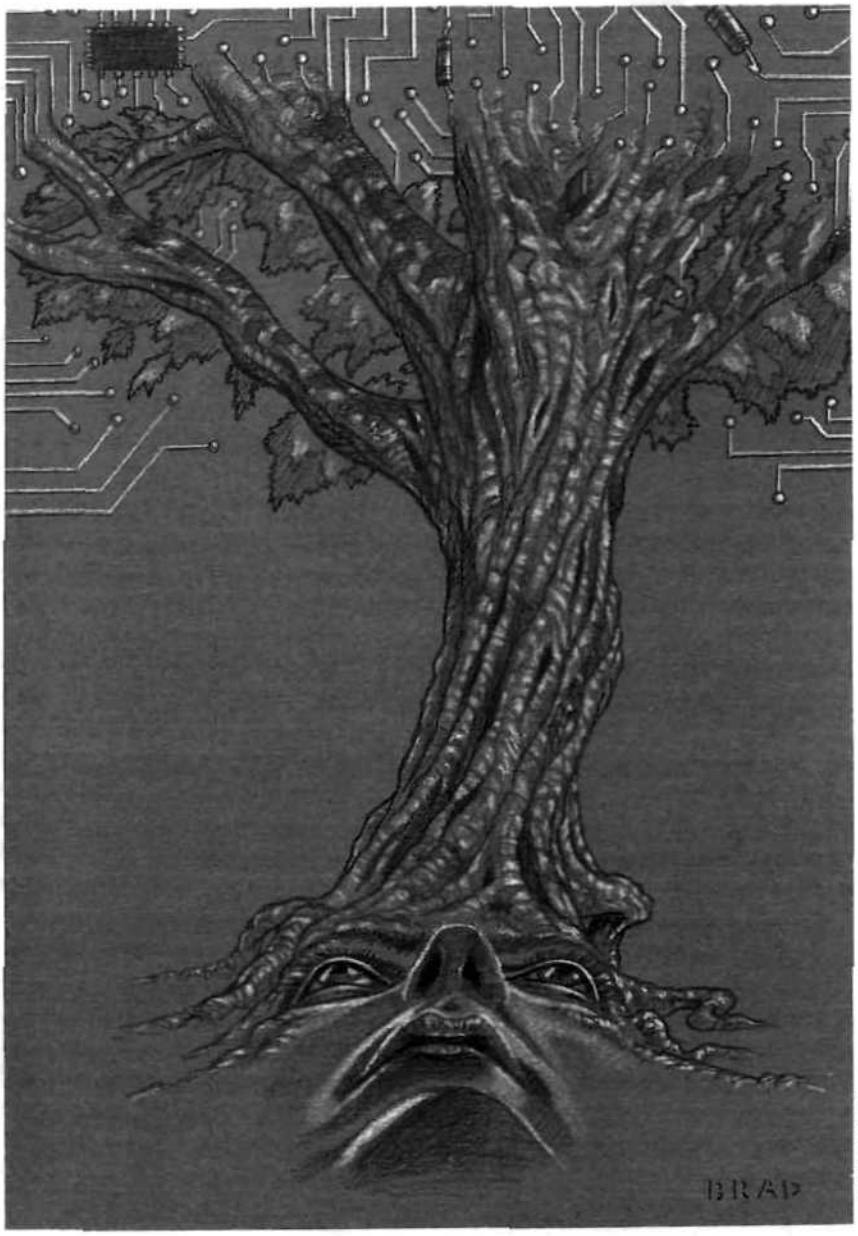
Consciousness is the most familiar and most mysterious feature of human experience. Until recently, consciousness was considered so inaccessible to scientific investigation that it was considered bad form to use the word. For most of the twentieth century, psychology has been dominated by behaviorism, which holds that only phenomena that can be objectively observed are proper subjects for scientific study. Now, scientists of the stature of Francis Crick, Roger Penrose, Gerald Edelman, and Donald Griffin are seriously interested in consciousness. Scientific and philosophical books on the subject are proliferating, and a new publication, the *Journal of Consciousness Studies,* has recently appeared.

Many people still consider consciousness to be an

illusion, misformulation, or meaningless concept, but there is something singularly unsatisfactory and empty about these attitudes. There is also a limit to explanation by illusion. The cat in the mirror is not a cat, but the image of the cat is an image. Illusion lies in interpretation, not in the immediate experience. When an amputee feels pain in the lost limb, the location is an illusion, not the pain. Reading the sentence "I am not reading" remains an act of reading. Consciousness not only exists—it is the basis of everything we value. Indeed, the idea of life without consciousness is like dehydrated water.

There has been a rudimentary science of consciousness since Hippocrates, known as the father of medicine, first postulated that the seat of consciousness lies in the brain. Today there is general agreement that consciousness in some way is associated with brain function. The effects of alcohol, head injuries, and drugs vividly demonstrate this association. Recently developed powerful techniques for observing features of brain activity—such as positron emission tomography and magnetic resonance imaging, along with the enormous development of computer technology—have stimulated the present surge of serious interest in many parts of the scientific community in developing a science of consciousness.

Despite the wealth of new information and insight, there remains great diversity and conflict of views ranging from mysticism to reductionism. Researchers in neurology, psychology, philosophy, and artificial intelligence commonly each consider the others' approaches to be limited or wrong. This was vividly illustrated by the boiling diversity of opinions at the 1994 meeting held at the University of Arizona, billed as the first interdisciplinary scientific conference on consciousness. The real significance of the conference was that it occurred at all, was well attended by distinguished researchers, and sparked an enthusiastic exchange of ideas.



Brad Marshall

A major problem in discussions of consciousness is the very loose usage of the word to connote a variety of meanings. Much controversy and confusion about consciousness arise from people talking past each other on different planes of meaning. Let us try to bring the uses of this rather vague word into sharper focus.

There is a great difference between dreamless sleep and waking. Further, anyone who has been administered the anesthetic sodium pentothal before surgery has experienced even more complete annihilation under this drug. An hour passes as if nothing has occurred, and there is no sense of being or of interval. There is an impression that there would be no difference between the passage of an hour or a year. The void of these experiences contrasts enormously with waking life. In broadest terms, consciousness is any experience of the individual that contrasts with that individual's encounters with times of voidness. Thus dreams, drug deliriums, and madness are also kinds of consciousness. Conscious experience has both structure and content and each has various features.

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There are multiform applications of the term consciousness to these features.

"Awareness" and "consciousness" commonly are used synonymously. Yet awareness does not quite complete the field of consciousness. There is a well-known black-and-white pattern that can be viewed either as a white vase on a black background or as a pair of black human profiles facing each other on a white background. We are aware of these views alternately, yet the pattern itself remains unchanged. When we look at the play of sunlight on a breezy lake we cannot be aware of all the sparkles and their movements at once, although they are present in the conscious visual field. There is more in conscious experience than that which is attended to. Much of what is in the field of consciousness does not enter awareness until it is in short-term memory. An observation does not observe itself as its moment of operation, although that observation can almost immediately be observed when it enters short-term memory. Awareness is an operation in the field of consciousness, and that which is simply in the field is conscious presence. Attention is focused awareness.

Sometimes consciousness is viewed simply as the response of a system to a stimulus, but in such a view a photoelectric cell is conscious of light. Other researchers consider self-reference or the ability of a system to respond to itself to be the essence of consciousness. But is a video camera recording its image in a mirror a case of consciousness? Marvin Minsky claims that the problem of consciousness is trivial, that he has solved it. He says certain computer programs with memory features that allow their processing steps to be retraced are more conscious than humans. By this highly restricted definition, he may be right.

Consciousness is regarded by some simply as thought. Thought is certainly associated with human consciousness, but again it does not complete conscious experience. Response, self-reference, and thought are structures in the process of consciousness. The complex of conscious experience also includes the presence and quality of visual, auditory, and tactual sensations; pain; and emotions. The structural features of consciousness are far more tractable to analysis than the qualitative ones. It seems far more remarkable that brain cells can generate the blueness of blue than that they can calculate. The generation of sensory qualities from neural processes is the most baffling aspect of brain function. Yet it is possible at this time to have a scientific approach to some features of the generation of sensory quality. Synesthesia is a rare, highly subjective experience in which two senses, such as vision and hearing, are experienced as a single sense. Recent research using radioactive xenon in the bloodstream has placed its generation in the brain's limbic system, which is concerned with emotion and motivation. Eventually it may be possible to identify the neural signature of any sensory quality.

Yet another view of consciousness focuses on self-consciousness. This has two forms: awareness of consciousness and awareness of the self. Awareness of consciousness is awareness of the sensual and emotional qualities in experience and of the phenomenon of consciousness itself. This kind of awareness can make philosophers and mystics of people. The concept of the self is of greatest importance to the individual. Although the self is not a thing or substance, it is a process, and as such is a real entity, much as a candle flame is a real entity.

The idea of the self as it appears in common usage incorporates the concepts of the person, the inner self, and the witness. The concept of a person is closely associated with a physical body operating in universal or "public" space. Each person in this outside view is considered to have a special "inner" view of his or her own, and to regard oneself from this special view as a person. A person is characterized by a spatiotemporal continuity of body and a temporal continuity of behavior, holding a particular store of memories and especially a continuity of self-observant processes. The identity of a person is more a matter of continuous form than of constant substance. From an outside view, this identity has both bodily and behavioral criteria; although identity is most definitively settled by references to the psychological rather than the physical features of the person.

The inner self is a special aspect of a person that involves the person's inner view. It consists of the part of consciousness that is a continuous process of awareness of experience, including awareness of its own ongoing processes; and it also consists of a part of that process that outpaces immediate awareness. It is not a specific entity like the pain of a bee sting, but is the continuity through time of the central view that perceives these processes, in unity with awareness of this ongoing central view and its continuity.

The witness is immediately observing. It is a part of the self that is always ahead of observation, and that part cannot be an object of observation for then it would not be the observing part. When the witness is perceived it is no longer the witness, but the witness is easily and intimately known through immediate short-term memory.

In summary, the self is characterized by a special central viewpoint from which perception has various unique perspectives, such as a unique geometrical perspective of the surrounding world and access to such experiences as sensations and emotions not available to other persons.

A great wealth of topics involving consciousness are now accessible, in principle, to scientific study that give rise to concepts and hypotheses that are verifiable or falsifiable.

One intensively studied approach to understanding the mind is through computer science and "artificial intelligence" (AI) research.

Strong AI holds that consciousness can be generated by an algorithm, a well-designed sequence of operations. It is necessary only to carry out the appropriate computations. The position of weak AI is that consciousness arises from the brain's physical action, and that this action can be simulated computationally, but that simulation

alone cannot generate consciousness. The human neural system, which is far more complex than any present-day computer, operates both consciously and unconsciously. Determining the neural basis of the difference between these modes can give insights to enlighten the claims of AI.

Much of human behavior is not accompanied by consciousness. When a hot stove is touched, the finger is withdrawn in one-tenth of a second, before the experience of pain, which happens in about one-half second. The brain's cerebellum controls the smooth coordination of muscular activity, such as walking, by an enormously complex orchestration of neural activity. This hugely complex activity is almost entirely unconscious, yet the cerebellum has 30 billion neurons, almost half as many as the brain's cerebrum. Some cells in the cerebellum have as many as 80,000 synaptic connections. The total number of connections may rival those of the cerebrum. Clearly, sheer complexity does not evoke consciousness.

One of the most remarkable and revealing types of unconscious behavior occurs in a form of epileptic seizure known as automatism. When an epileptic "discharge" occurs in the upper brain stem, the individual becomes unconscious but may continue working at whatever task was under way when the attack occurred. The great brain surgeon Wilder Penfield, who devised surgery to treat epilepsy, was very interested in the phenomenon. He wrote:

> In an attack of automatism the patient becomes suddenly unconscious, but, since other mechanisms in the brain continue to function, he changes into an automaton. He may wander about, confused and aimless. Or he may continue to carry out whatever purpose his mind was in the act of handing on to his automatic sensory-motor mechanism when the highest brain-mechanism went out of action. Or he follows a stereotyped, habitual pattern of behavior. In every case, however, the automaton can make few, if any, decisions for which there has been no precedent. He makes no record of a stream of consciousness. Thus he will have complete amnesia for the period of epileptic discharge and during the period of cellular exhaustion that follows.
>
> Thus, the automaton can walk through traffic as though he were aware of all that he hears and sees, and so continue on his way home. But he is aware of nothing and so makes no memory record. If a policeman were to accost him he might consider the poor fellow to be walking in his sleep.

Clearly, not all states of brain activity evoke consciousness. What kind of neural activity is present with consciousness and how does it differ from activity with no consciousness? Penfield believed that the seat of this special activity is located in the upper brain stem, and noted that it is directly connected to the brain's cerebral cortex, not with the automatic sensory-motor mechanism. If we knew the nature of this activity we could compare it with activity in a computer.

If strong AI is true, then consciousness arises from a special kind of complexity. AI proponents are very unclear about how this is possible. The solidity of material objects can be explained by the repulsion between atoms of colliding objects, but no such clear principle is offered to explain how consciousness can arise from complexity. It is usually simply asserted that it is present. Both dualists and reductionists fail to close the mind-matter gap. At the gap there is much hand-waving, shouting, and name-calling—but when Frankenstein throws the switch, his monster fails to sit up.

"When an amputee feels pain in the lost limb, the location is an illusion, not the pain."

The confidence of strong AI proponents is supported by a theory, generally agreed by mathematicians to be true, known as the Church-Turing thesis. This thesis holds that, in principle, a computer can be programmed to mimic any process that can be precisely and unambiguously described. A Turing machine is an ultimately simple, idealized computer that has unlimited storage space and only a very few well-defined operations, such as printing a "1" or a "0." The Church-Turing thesis holds that this type of machine can perform any mechanical operation whatsoever. The reduction of all algorithms to the operations of a Turing machine is a remarkable and powerful result of this idea, and all modern computers are elaborations of a Turing machine.

The fundamental problem with strong AI is that it does not distinguish between content and pure form. An ink drawing of a landscape can be perfectly reproduced by a glass etching, but no amount of etching can produce ink. Water can have current, but current alone cannot produce water. A computer simulation of digestion is not digestion, but in contrast, a system of tubes and chemicals might duplicate digestion. Strong AI makes no distinction between simulation and duplication.

At this time we have no idea how to simulate consciousness. We do not know how the brain does it. Some new science may be required to find out, Roger Penrose believes. Perhaps the brain uses some feature of the electromagnetic field that has not been discovered or considered. If this becomes known it may be possible in principle to duplicate consciousness by some artifact, and weak AI will be vindicated. But then there will be some causal basis for consciousness, not merely an algorithm. A Turing machine need not be an electronic device. It can, in principle, just as well be a system of cogs or even water pipes. Mere computation by such devices cannot duplicate consciousness, although it might duplicate thought, which is a structure that does occur in consciousness.

Alan Turing devised a test to determine if a computer has consciousness. He believed that if the computer responded to sustained questioning with answers indistinguishable from the response of a human, then it must have consciousness. It would not be difficult to program a computer to do

mathematical addition in a human way by programming it to be slower and more prone to make errors. It would actually have an ability indistinguishable from a human ability. But addition is a process that is not dependent on a specific physical basis. Suppose we are questioning a computer 10,000 miles away and we ask it whether it is transmitting by wire or radio. If it claims radio and its response is faster than is possible for wire, then we know it is transmitting by radio. Radio transmission has a definite physical basis in electromagnetic waves. If an artifact was able to pass the Turing test for consciousness, this would be a good reason for the interrogator to believe it was in the presence of consciousness. But this would mean that the artifact had the specific physical basis for consciousness, not that consciousness itself is an algorithm. Such an occasion would be a triumph for weak AI, not strong AI.

It seems unlikely that such an elaborate phenomenon as consciousness could be a mere epiphenomenon. What evolutionary advantage could it have? The answer seems to be before us in the behavior of the epileptic automaton. This behavior strongly suggests that the function of consciousness lies in decision-making and planning. It is needed to handle situations where new judgments must be formed and where rules have not already been established. Another important feature of consciousness is the powerful driving force of emotions. Emotions arrest our attention and give direction to our actions. The evolutionary advantage is to direct resources in directions vital for survival.

There are subtle features of the field of consciousness that enable its function of decision-making. One of these features is the unity of the field. For example, a visual scene is processed by neurons scattered throughout the visual cortex, yet the result is a unified perception. Neurologists do not yet understand how this happens and they call it the "binding problem." The advantage of this oneness for decision-making lies in having a single connected fabric that gives speed and fluidity for scanning by the attention. Otherwise it would be necessary to scan all over and compare various parts of the brain in a step-by-step time-consuming process.

It is interesting that attempts to simulate simple object recognition in the visual system by computers have been computationally intensive, requiring far larger times than the visual system. Realistic results have been found to require longer and longer amounts of computer time, although the speed of signal propagation in computers is about a million times faster than the brain's. Computer programming requires an enormous knowledge base, and as the base becomes bigger the problems of access compound in difficulty. Such tasks are done at a glance by children. If consciousness has evolved for such skills as decision-making, planning, and pattern recognition, then an algorithmic computer might be exposed as deficient by presenting it with situations requiring these skills. An algorithm would be less efficient and the machine discredited by its inordinately long response time. The machine could do much better if it could produce an integrated field of information that simulates the integration of the field of consciousness.

Another subtle feature of the field of consciousness is that it is "centered"; there is one part of the field that can give focused attention to all other parts. For example, the different parts of the visual field do not "know" each other, but the attention knows them and their relations. One sound does not hear another, but the attention does hear them. Centering is the basis for a single agent that can scan the field.

Most neural activity does not manifest in the field of consciousness, and there is evidence that the neural activity that does manifest in the field arises from preconscious activity. Benjamin Liebt has done research that indicates the brain takes about one-half second to produce consciousness. He found that by stimulating electrodes in the brain cortexes of his patients, he could give them the sensation that their arms had been touched. But they had this experience only if the stimulation lasted one-half second. In other experiments Liebt asked volunteers to flex a finger at will while their brain waves were monitored by an electroencephalograph. The surprising result was that their brains showed neural activity 0.3 seconds *before* they made the decision to act. These remarkable results suggest to Susan Blackmore that consciousness is rather like an afterthought. They also suggest that the physical process at the basis of consciousness in the familiar integrated field may also act in isolated bits that are not in that field. Perhaps the hot stove or the flexing of the finger are in a base conscious mode before being integrated into the field consciousness. It is integration into the field that requires one-half second. The pre-field pain has the same "substance" as the field pain, but because it is more like a spot of paint than a painting, there is not enough structure to experience the pain's full distress. It seems possible that the epileptic automaton may be operating on an unintegrated base consciousness. Of course most of the brain's functions, such as those of the cerebellum, are probably not in any sort of consciousness.

What advantage for the organism does the self have? The concept of the self allows the individual to have a definite place in its model of the world. This gives a more refined advantage for planning and strategy. It also gives

Consciousness continued on page 56

"Consciousness is any experience . . . that contrasts with that individual's encounters with times of voidness. Thus dreams, drug deliriums, and madness are also kinds of consciousness."

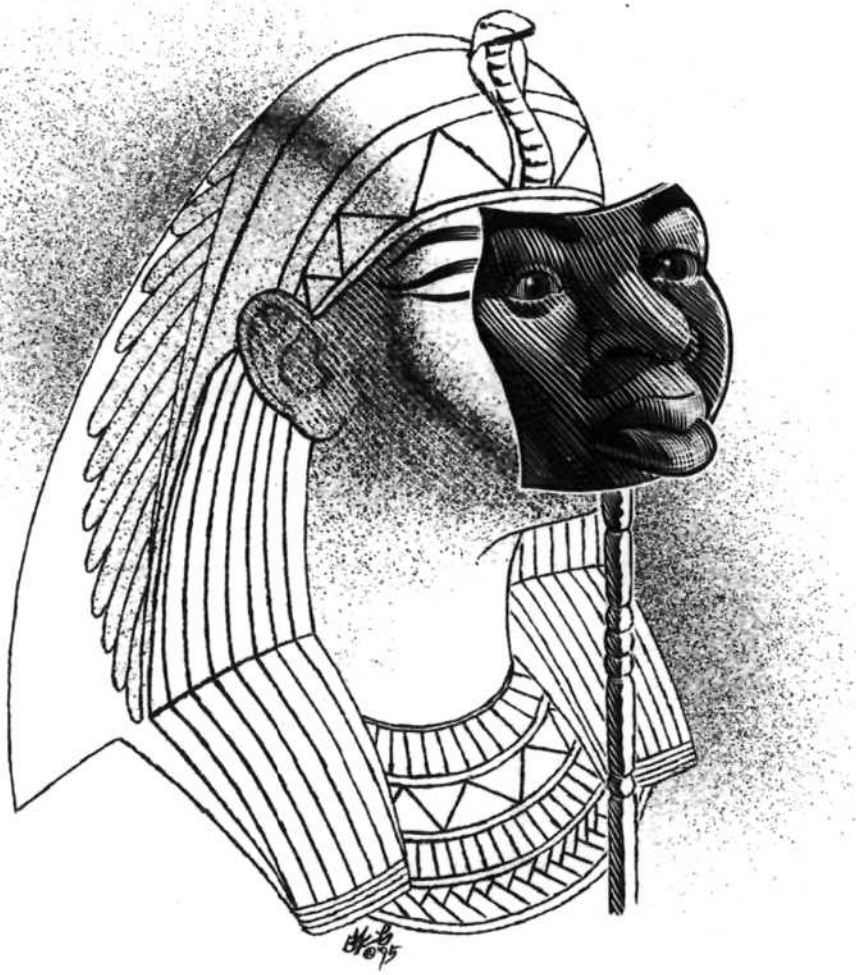
School Daze:
A Critical Review of the 'African-American Baseline Essays' for Science and Mathematics

WALTER F. ROWE

These essays are riddled with pseudoscience and pseudohistory. They should not be used for the training of teachers or the teaching of students.

In the early 1980s the Portland Public School District in Portland, Oregon, was faced with the task of preparing a court-ordered desegregation plan. A consultant to the school district, Asa Hilliard of Georgia State University, suggested the concept of the "African-American Baseline Essays" as part of Portland's plan.

The baseline essays were conceived as short stories presenting the history, culture, and contributions of Africans and African-Americans to art, language, mathematics, science, social studies, and music. These essays were to serve as reference and source materials for teachers in much the same way as textbooks. The "African-American Baseline Essays" have been adopted by the Portland and Detroit public school systems; they have been seriously considered for adoption by public school systems in Atlanta, Chicago, and Washington,



Gerald Fried

D.C. (Ortiz de Montellano 1991).

Although the authors of the "African-American Baseline Essays" were supposedly selected because of their knowledge of their specific disciplines and because of their expertise in African and African-American history, the scholarly credentials of the authors of the science and mathematics essays are highly suspect. The author of the science essay is Hunter Havelin Adams III, who is described in the foreword to the essays as a "research scientist at Argonne National Laboratory." Adams was not, in fact, a research scientist but a hygiene technician who had only a high school diploma (Ortiz de Montellano 1991).

The mathematics essay was written by Beatrice Lumpkin, associate professor of mathematics at Malcolm X College (a community college in Chicago). Lumpkin's scholarly writings appear to be confined to brief notes in *Historia Mathematica* and articles in *Journal of African Civilizations.* None of these works contains any original work in either mathematics or history. Lumpkin is also the author of a historical novel and a children's book about ancient Egypt.

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In the Beginning

Beatrice Lumpkin begins her mathematics essay with a discussion of prehistoric African systems of numeration. The discussion centers on the Ishango bone, an artifact excavated in Zaire that has been dated to 6500 B.C. (Marshack 1972). The Ishango bone is engraved with a series of parallel scratches having varying lengths and grouped according to some system. A variety of explanations of the marks have been advanced: They may represent a multiplication table, a game tally, or a calendar.

The reader of the mathematics essay is clearly intended to infer that systems of numeration originated in Africa. However, the Ishango bone is a rather recent example of a type of inscribed artifact produced by Paleolithic cultures stretching from the Iberian Peninsula to the Russian steppes. Most of these artifacts have been found in Europe. These facts are easily gleaned from Alexander Marshack's *The Roots of Civilization* (1972), a source Lumpkin cites in the mathematics baseline essay and in other writings.

Way Down in Egypt Land

A key concept running through the "African-American Baseline Essays" is that Egypt was an African civilization. This means something beyond the obvious fact that Egypt is located in Africa. In the science essay, Adams repeats the claim of Senegalese physicist Cheikh Anta Diop that the ancient Egyptians were descended from central equatorial and northwestern African ethnic groups (Diop 1982). Physical anthropologists, however, do not accept Diop's conclusions. Brace et al. (1993) have presented the results of a comparison of 24 craniofacial measurements made on skeletal material from Egypt, Europe, North Africa, Nubia, Somali, India, Asia, and North America. The measurements chosen were ones that are known to be genetically controlled, but only trivially adaptive. These researchers concluded that the ancient Egyptians are much more closely related to the populations of neolithic Europe, modern Europe, North Africa, and India than to the populations of sub-Saharan Africa. These conclusions are consistent with the research of other physical anthropologists (see Brace et al. [1993] for a complete list). The inclusion of discussions of Egyptian science and mathematics in the "African-American Baseline Essays" therefore is based on a fun-

damental misunderstanding of the biological relationships among the various African subpopulations.

Even if it were true that the ancient Egyptians came from the same racial stock as sub-Saharan Africans, the discussions of Egyptian science and mathematics in the "African-American Baseline Essays" would still be worthless for the training of public school teachers. Lumpkin's mathematics essay is merely shoddy scholarship, while Adams's science essay unites pseudoscientific claims with fanciful attempts at substantiation.

The science essay contains a number of diagrams purporting to demonstrate the ancient Egyptians' extraordinary scientific and mathematical sophistication. For example, Adams reproduces as a full-page illustration a site plan of the Temple at Luxor with a human skeleton superimposed on it to demonstrate that the Egyptian architects designed the temple so that its subdivisions would conform to the proportions of the human body. A cursory glance at the diagram reveals that while the skeleton's ankles and knees do indeed match crosswalls on the plan, none of the other joints (hips, wrists, elbows, or shoulders) corresponds to any significant feature of the temple. That the builders intended a correspondence between the temple and the human skeleton is rendered highly unlikely by another fact: The portion of the temple that is supposed to represent the cranium, rib cage, pelvis, and upper legs was built by Amenophis III; the remainder of the temple was built by Ramses II, approximately two generations later (Baines and Malek 1980).

Adams's science essay contains a healthy dollop of Great Pyramid mysticism. According to Adams, the geometry of the Great Pyramid encodes as follows:

> the value of pi, the principle of the golden section, the number of days in the tropical year, the relative diameters of the earth at the equator and the poles, and ratiometric [*sic*] distances of the planets from the sun, the approximate mean length of the earth's orbit around the sun, the 26,000-year cycle of the equinoxes, and the acceleration of gravity.

One of the figures accompanying the science essay also informs the reader that the height of the Great Pyramid multiplied by 10^9 yields 91,651,673 miles, approximately the mean distance from the earth to the sun.

This last assertion carries no weight as evidence that the Egyptians possessed an unusual level of scientific knowledge. There is no reason to multiply the pyramid height by 10^9 (other than to get the desired answer). If by chance the height multiplied by some simple factor did not give an approximation of the mean distance from the earth to the sun, another multiplier certainly could have been found that would give the distance to the moon, to the nearest star, or to the Andromeda nebula. Writing the product to eight significant figures incorrectly implies that the height of the Great Pyramid is known with the same precision. Adams is evidently unfamiliar with the concept of significant figures (taught to high school physics and chemistry students).

Adams repeats a standard claim of Great Pyramid mysticism that the structure encodes a number of mathematical formulae. For example, the perimeter of the base divided by twice the height supposedly gives the value of pi (which is 3.14159265). Indeed if one performs this computation using the dimensions of the Great Pyramid, one gets a good estimate of pi (3.150685).

Pyramidologists like Adams characteristically restrict their attention to the Great Pyramid and all but ignore other Egyptian pyramids. Forty-seven royal pyramids are known to have existed. The heights and base dimensions of 22 true pyramids belonging to this group can be determined with a reasonable degree of accuracy (Baines and Malek 1980). If these dimensions are used to calculate pi, one obtains values ranging from 2.58 to 4.42. Furthermore, the value of pi calculated from the dimensions of a pyramid depends on the slope of its sides. Extant Egyptian mathematical papyri reveal problems dealing with the slopes of pyramids and use four different values for the slopes (Gillings 1972).

In another section of the science essay Adams discusses what he calls "psychoenergetics," saying, "The ancient Egyptians were known the world over as the masters of 'magic' (psi): precognition, psychokinesis, remote viewing and other underdeveloped human capabilities." According to Adams, psi was an exact science that was used to preserve the world order and protect the pharaoh. However, if the Egyptians were such powerful magicians, why were they conquered by the Persians? Why were ten revolts against the Ptolemies unsuccessful?

"The 'scholarly' research displayed in both essays is too shoddy to serve as a model for any teacher or student."

Adams subsequently informs readers that ancient Egyptian doctors were also experts in the healing technique now known as Therapeutic Touch. Readers of SKEPTICAL INQUIRER will be familiar with the unsubstantiated claims of the advocates of this fringe medical therapy. Adams is deeply confused about the distinction between science and pseudoscience.

Adams also has a penchant for wild extrapolation from limited data. He discusses a small model of a bird found in a tomb at Saqqâra in 1898. When a replica of this model was made from balsa wood and a horizontal stabilizer (not present in the original) added, the replica was able to glide a short distance (Messiha et al. 1984). However, balsa wood is roughly 20 times less dense than the sycamore wood from which the original artifact was made; consequently, the aerodynamic performance of the balsa wood replica was significantly different from that of the original. From this incompetent exercise in experimental archaeology,

Adams leaps to speculations about the ancient Egyptians' use of transport and recreational gliders. The articles that Adams cites here were not written by professional Egyptologists.

Beatrice Lumpkin's treatment of Egyptian mathematics is marginally better than Adams's discussion of Egyptian science. It still violates the canons of historical scholarship in a number of ways. Lumpkin frequently cites her own fictional writings as authorities to substantiate her assertions. She also frequently omits facts, especially when those facts do not support her conclusions.

For example, Lumpkin states that the Egyptian value of pi was better than the biblical or Mesopotamian value of pi equal to three. Nine estimates of the value of pi were calculated before A.D. 1000. Of these, the Egyptian value was the second most inaccurate (Beckmann 1971). The use of a value of pi equivalent to 3.125 has been found in a Babylonian cuneiform tablet. This tablet is discussed in George Sarton's *A History of Science* (1966), a source cited by Lumpkin elsewhere in her mathematics essay.

There are grounds for doubting that the Egyptians had an understanding of the concept of pi (Bunt et al. 1976). The Rhind mathematical papyrus shows how the Egyptians calculated the area of a circle from its diameter. To get the area, 1/9 of the diameter is first calculated; this fraction is subtracted from the value of the diameter; and the result is then squared. This is equivalent to using a value of pi equal to 256/81. This procedure for calculating the area of a circle appears to have been developed empirically (Gillings 1972).

Beware of Greeks

When Adams and Lumpkin attempt to deal with later historical periods than ancient Egypt, their accuracy as historians should be better because Greek science and mathematics are better documented than Egyptian science and mathematics. Adams has difficulty getting even the most basic facts correct about Alexander the Great and Alexandria:

> In fact, the Greeks called Egypt the seat of scientific knowledge and sent many of its [*sic*] most brilliant scholars there to study such as Thales, Democritus, and Pythagoras. Perhaps it was this reason Alexander made Alexandria, Egypt, the capital of his empire after he conquered Egypt in 325 B.C.

Alexander did not make Alexandria the capital of his empire. Alexander actually never saw the Alexandria to which he gave his name; he ruled from Babylon and Susa until his death. These facts are readily verifiable in the writings of ancient historians, such as Plutarch and Arrian. And contrary to the claims of both Adams and Lumpkin, Alexandria was not an Egyptian city. It was founded as a Greek colony and was not legally part of Egypt. In antiquity it was commonly referred to as "Alexandria near Egypt" (Sarton 1966; Fraser 1972).

"The science and mathematics essays distort the history of the transmission of Islamic science and mathematics to Europe."

Adams's version of Egypt under the rule of the Ptolemies is similarly a farrago of misinformation:

> Frequently, it is assumed that, during the Hellenistic period of Greek rule, the African character of Egypt was negligible, however, to the contrary, the Greeks practiced a policy of assimilation, marrying Egyptian women and even adopting Egyptian religion.

All of this is demonstrably false. There was no such policy of assimilation. In fact, for many generations the Greeks in Egypt disapproved of marriages with native Egyptians. It was also many generations before native Egyptians held high government offices or military commands. The Greek and Macedonian presence in Egypt has been compared to that of the Boers in South Africa and whites in the antebellum U.S. South (Bevan 1968; Lewis 1986).

The intellectual elite of Alexandria during the first century after the death of Alexander—the most creative period of Hellenistic mathematics and science—was composed almost exclusively of Macedonians and Greeks from outside of Egypt. Manetho, the historian to whom we owe the division of Egyptian history into dynasties, is the only identifiable Egyptian intellectual during this period (Sarton 1966; Fraser 1972).

Beatrice Lumpkin fulminates against the supposed racism of the writers of mathematics textbooks:

> Euclid of Alexandria, one of the greatest mathematicians of this era, lived and died in Egypt. There is no suggestion that he ever left Africa. Yet he is pictured in textbooks as a fair European Greek, not as an Egyptian. We have no pictures of these mathematicians, but we could at least visualize them honestly in costumes, complexions, and features true to the peoples and their times.

It is highly improbable that Euclid was a native Egyptian. He wrote in Greek and his name is a common Greek one. This name was sufficiently common in antiquity that Euclid the mathematician was confused with the philosopher Euclid of Megara (Heath 1926). It is also likely that Euclid lived for a time in Athens. The mathematical commentator Proclus preserves a tradition that Euclid was a Platonist (Morrow 1970). At the time of Euclid the books of Plato had not yet begun to circulate widely, making it likely that Euclid lived at some time in Athens and attended Plato's Academy. T. L. Heath, the leading expert on Greek mathematics and Euclid in particular, believed that Euclid must have studied at some time in Athens because it was only in Plato's Academy that he could have learned the mathematics that later appeared in the *Elements* (Heath 1926).

Euclid's *Elements* is also firmly a part of Greek mathematical traditions. Three earlier Greek mathematicians are known to have written similar elements of geometry (Morrow 1970). Significantly, one of these works was the mathematics manual written by Theudius of Magnesia for use by Plato's Academy (Heath 1926). Lumpkin is glowing in her praise of the *Elements:* "The logical arrangement of this work is so masterful the *Elements* dominated the teaching of geometry for 2,000 years." The abstraction of the *Elements* is Platonic, while the method of exposition (definition, common notion, postulate, and theorem) is Aristotelian (Heath 1926; Bunt et al. 1976). The extant Egyptian mathematical papyri have only the remotest similarity in form and content to Euclid's *Elements.*

Historians of mathematics consider the Egyptian influence on Greek mathematics to be minimal. This influence was confined to the very elementary geometry of the time of Thales, to practical methods of calculation (the branch of mathematics the Greeks called "logistika") and to the proto-algebra of Diophantus. The Greeks borrowed much more heavily from the mathematics of Mesopotamia (Heath 1921; Eves 1971; Fraser 1972).

Who Is Al-Khwārizmī and Why Is He In 'African-American Baseline Essays'?

When she reaches the Middle Ages, the period of Islamic mathematical dominance, Beatrice Lumpkin enthuses: "In summarizing the contribution of the African Muslim mathematicians, *especially those of the Nile Valley,* an author is overwhelmed by an embarrassment of riches." [Emphasis added.] The "African-American Baseline Essays" section on mathematics discusses eight Islamic mathematicians: Al-Khwārizmī, Abū Kāmil, ibn Yūnus, ibn al-Haytham, Omar Khayyam, Nasir Eddin, Al-Kāshī, and Al Qasadi. Of these, only Abū Kāmil and ibn Yūnus can be considered in any sense African. Beyond his appellation as the "Egyptian calculator," virtually nothing is known of Abū Kāmil's life (Levey 1980). Ibn Yūnus lived and worked in Cairo in the tenth century (Goldstein 1965; King 1980). Of the remaining Islamic mathematicians, only ibn al-Haytham had an association with Africa. Ibn al-Haytham (known to Europeans as Alhazen) was educated in Baghdad; he came to Egypt to participate in an unsuccessful project to dam the Nile River (Vernet 1965; Sabra 1980; Hogendijk 1985).

The origins of the remaining Islamic mathematicians mentioned in the mathematics essay are well known:

Al-Khwārizmī—Urgench in former USSR (Berggren 1986).
Omar Khayyam—Nishapur (now in Iran) (Berggren 1986).
Nasir Eddin—Khorasan in Persia (Eves 1971).
Al-Kāshī—Kashan (90 miles north of Isfahan) (Berggren 1986).
Al-Qasadi—Granada (mathematics baseline essay).

Lumpkin and Adams get many of the facts about the lives and works of Islamic mathematicians and scientists wrong. Both Lumpkin and Adams mention the Dar al-Hikma (House of Wisdom) established by the Fatimid rulers of Egypt in Cairo. Both essay authors have ibn al-Haytham working in the Dar al-Hikma; however, the only institution in Cairo with which ibn al-Haytham is known to have been associated is the al-Azhar Mosque (Sabra 1980). Lumpkin also describes ibn Yūnus working in the Dar al-Hikma. This is highly unlikely: The Dar al-Hikma was founded in A.D. 1005; ibn Yūnus made his last astronomical observation in A.D. 1003; and died in A.D. 1009 (Sourdel 1965; King 1980). The article on the Dar al-Hikma in the *Encyclopedia of Islam* (Sourdel 1965) does not mention the name of a single Islamic scientist in connection with the Dar al-Hikma.

The Transmission of Islamic Mathematics and Science to Europe

The science and mathematics essays distort the history of the transmission of Islamic science and mathematics to Europe. According to both Adams and Lumpkin, Europeans learned about Egyptian, Hindu, and Arabic mathematics and science through the translations of Constantinus Africanus (born in Carthage in North Africa). As Beatrice Lumpkin describes it, Constantinus "brought a precious cargo of manuscripts to Salerno, where a school was founded to translate and study the Arabic works." Characteristically, Lumpkin neglects to tell readers what manuscripts he brought to Salerno. Adams is similarly uninformative. The works that Constantinus Africanus translated were the medical treatises of Galen, Hippocrates, the Persian doctor Haly Abbas, and the Jewish physician Isaac Israeli (Castiglioni 1941; Crombie 1959).

"According to Adams, psi was an exact science that was used to preserve the world order and protect the pharaoh."

Adams explicitly charges European scientists with plagiarizing the discoveries of Islamic scientists. For example, he asserts that ibn al-Haytham discovered the refraction of light and that credit for this discovery has been falsely ascribed to Isaac Newton. Not unexpectedly, Adams cites no authority for this extraordinary statement. The mathematical law governing the relation between the angle of incidence and the angle of refraction is commonly known as Snell's Law (after the seventeenth-century Dutch physicist Willebrord Snell). Ibn al-Haytham came close to discovering this law, but ultimately failed to do so (Al-Daffa' 1977).

According to Adams, Newton also has been improperly credited with the discovery of the law of gravity, saying it actually was discovered by Al-Khāzin. Adams has confused Al-Khāzin, a Sabaean mathematician and astron-

omer of Persian origin (Dold-Samplonius 1980), with al-Khāzinī, the author of the *Book of the Balance of Wisdom*. In mathematician al-Khāzinī's theory of weights, the weight of a body varies according to its distance from the center of the world. Accordingly, objects at the center of the world weigh nothing. This is a far cry from Newton's inverse square law for the force of gravity acting between two masses. At this point, the reader will probably not be surprised to learn that al-Khāzinī was actually a Byzantine Greek (Hall 1980).

Adams also charges that the work of the astronomer al-Battānī was stolen by Copernicus. Copernicus did indeed use some of al-Battānī's astronomical observations (Hartner 1980; Duncan 1976); Copernicus clearly acknowledged this use. In Book One of *On the Revolutions of the Heavenly Spheres* Copernicus explicitly cites al-Battānī as the source of the erroneous estimate that the sun's diameter is only ten times that of Venus (Duncan 1976).

Finally, Adams asserts that the works of al-Bīrūnī were plundered by both Galileo and Francis Bacon. Unless these Western scientists were able to read Arabic (which is doubtful) they could scarcely have taken any of their ideas directly from his works. None of al-Bīrūnī's books were translated into European languages during the Middle Ages or the Renaissance. Many have never been so translated. Having been born south of the Aral Sea in Khwārizm, al-Bīrūnī was not African. There is irony in Hunter Havelin Adams III invoking the name of al-Bīrūnī. In the words of one biographer, "Bīrūnī had a remarkably open mind, but his tolerance was not extended to the dilettante, the fool, or the bigot" (Kennedy 1980).

Conclusion

The science and mathematics essays in the "African-American Baseline Essays" are riddled with pseudoscience and pseudohistory. As tools for the training of public school teachers they are not merely worthless, but are likely to prove pernicious. Their fallacious modes of reasoning may dull the critical faculties of readers. The "scholarly" research displayed in both essays is too shoddy to serve as a model for any teacher or student. The essays will contribute to the growing tribalization of American culture. A purported goal of the "African-American Baseline Essays" is to "eliminate personal and national ethnocentrism so that one understands that a specific culture is not intrinsically superior or inferior to another." This statement is nothing but cant. Throughout the science and mathematics essays the genuine achievements of Greek, Arab, Persian, and European scientists and mathematicians are ruthlessly pillaged, and credit for them assigned to black African cultures on the flimsiest of grounds.

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Mystical Medical Alternativism

JACK RASO

Hundreds of mystical or supernaturalistic health treatment methods have been advanced in recent decades. Here are 31 of them.

The term *alternativism,* which I coined last year, refers to a motley accumulation of movements whose central thesis seems to be: faith, based on common sense, subjective experience, or revelation preempts rational understanding. *Medical alternativism* is composed of three divisions that overlap one another: (1) alternative healthcare; (2) occult medicine; and (3) sectarian religious "healing." The dominant division, alternative healthcare, is a phantasmagoria of systems and methods. Its doctrines posit numerous forms of energy alien to physics; and its overall aims are to make health science a sham and to desecularize healthcare.

The major distinctions of alternative healthcare, vis-à-vis establishmentarian (science-oriented) healthcare, include runaway cross-pollination and a lack of constructive infighting. Since the late 1950s, more than 650

health-related methods—i.e., free-standing methods, multimethod systems, component methods, and general "approaches" that I consider mystical or supernaturalistic—have been subjects of uncritical public discourse (most since 1980).

Broadly, *mysticism* is belief in realities accessible only through subjective experience. *Supernaturalism* is belief in entities or forces that are outside of, yet affect, the universe. The vast majority of the systems and methods of alternative healthcare are mystical or supernaturalistic. It may be cavalier to judge methods solely on the basis of the theories that underlie them, the methods' contexts, their histories, and the credibility or implausibility of claims for the methods. However, such information furnishes valuable clues, especially when pertinent scientific findings are nonexistent, meager, or discrepant.

Alternative healthcare is a "melting pot" of religion, occultism, folklore, parapsychology, pop psychology, pseudoscience, and medical guesswork. It overflows with theoretical rubbish. In the sprawling, animistic "enchanted forest" of medical alternativism, ideas run hog-wild, words have magical power, illness ("dis-ease") is an educational opportunity, the impossible is a challenge, wishful thinking is industry, faith is the ticket, and death is a transition.

Below I describe some alternativist methods that are mystical or supernaturalistic.

Advanced pranic healing: Subject of a "serious reference work" of the same name, written by chemical engineer and "Master Pranic Healer" Choa Kok Sui. The method allegedly uses "color pranas" and "chakral" techniques to effect "very rapid healing." It includes "divine healing." Sui is also the author of the bestseller *Pranic Healing* (1990) and his companion piece, *Pranic Psychotherapy* (1993). (See "Pranic psychotherapy," below.)

Alternative 12 Steps: Nontheistic and purportedly secular variation of the Twelve Steps. The Twelve Steps—e.g., "[We] came to believe that a Power greater than ourselves could restore us to sanity"—are the basis of such programs as Alcoholics Anonymous. In *The Alternative 12 Steps* (1991), Martha Cleveland, Ph.D., a self-styled atheist/agnostic, and Arlys G., a longtime atheist, define the Twelve Steps as "a program for living, a program of action fueled by spiritual energy" that suggests "a system of holistic healing—a practical system of action" integrating "mind, body and spirit." Three of the authors' "Steps" affirmatively mention "spiritual resources" or "spiritual energy."

Bach flower therapy (Bach flower essence method, Bach flower essence system): Quasi-homeopathic system of pseudodiagnosis and pseudotherapy developed in the 1930s by British physician Edward Bach (1886-1936). (See Lynn McCutcheon, "Bach Flower Remedies: Time to Stop Smelling the Flowers?" *SI*, July-August 1995.) Bach put forth his philosophy in *Heal Thyself: An Explanation of the Real Cause and Cure of Disease*, first published in 1931. Therein he described five "fundamental truths": (1) Souls, invincible and immortal sparks of the "Almighty," are the "real," "Higher" selves of humans. (2) Humanity's purpose is to develop virtues and wipe out all intrapersonal wrongs. Souls know what circumstances conduce to the perfection of human nature. (3) One's lifetime is a minuscule part of one's evolution. (4) When one's "Soul" and personality are "in harmony," one is healthy and happy. The straying of the personality from the dictates of the "Soul" is the "root cause" of disease and unhappiness. (5) The "Creator of all things" is "Love," and everything of which humans are conscious manifests the "Creator."

Bach held that disease was essentially beneficial and that its design was to subject the personality to the "Divine will" of the "Soul." Supposedly, he "psychically" discovered the specific "healing" effects of 38 wildflowers. The "life force" ("soul quality" or "energy wavelength") of each of these flowers allegedly is transferable to water and thence to humans. Each of the so-called Bach flower remedies is a liquid that supposedly contains a "soul quality" with an affinity to a human "soul quality"; and each vegetable "soul quality" allegedly harmonizes its human counterpart with the "Soul." The bases of classical "diagnosis" are conversation and intuition. Administration of the "remedies" is usually oral but may be external.

Biological Immunity Analysis™ (BIA, Biological Immunity System™): Companion to nutripathy (see below) developed by Gary A. Martin, D.N., Ph.D., Th.D., D.Sc. BIA, is a "complete holistic system" whose centerpiece is purported deciphering, with the Biological Immunity CompuSystem™, of "Physical-Mental-Emotional frequencies" in specimens of urine and saliva. It allegedly reveals the donor's "Soul Pattern" ("the pattern inherent in your Soul," "a gift from God").

BioSonic Repatterning™: System that encompasses cymatics and toning. Cymatics is "the science of wave phenomena." Cymatic therapy is an acupressurelike method wherein devices send "beneficial" sound through the skin. Its purported objective is to reestablish "healthy resonance" in tissues. Toning is a vocal method that supposedly brings new "life energy" to "inhibited" or "unbalanced" parts of the body. BioSonic Repatterning also involves using "bija mantras" ("healing mantras" that purportedly activate "elemental energy qualities") and tuning forks (to produce "Balance," which is supposedly the "natural state" of humans).

Blood crystalization (diagnostic blood crystallization): Pseudodiagnostic method involving the introduction of a blood sample to a copper chloride solution. "Crystal signs" of illness in the resultant "blood-crystal picture" allegedly express the guidance of "a higher functional plane coming to

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Patrick Hubenthal

expression." "Organ-signs," for example, purportedly indicate dysfunction of an organ or a bodily system. Supposedly, each so-called organ-sign reflects a "multilayered organ principle" (which includes "the organ-bound 'soul organ'") and, on "the psychic plane," is the foundation for related "soul qualities."

Chiki energy flow: "Treatment" reportedly invented by Masato Nakagawa, Ph.D., the founder of *shinkiko* (see below). It allegedly relieves discomfort and pain by improving "energy flow."

The Clean-Me Out Program™: Neo-Christian system of "self-healing" developed principally by Richard Anderson, N.D., N.M.D. Two herbal supplements constitute its foundation: *Chomper,* whose 11 herbs include cascara sagrada (a laxative) and lobelia

(ingestion of which is risky); and *Herbal Nutrition,* whose 10 herbs include alfalfa, comfrey (which is poisonous), horsetail (a weak diuretic), and licorice root. Besides these and other supplements, the program involves enemas and avoiding intake of meat and dairy products. In the fourth (second revised) edition of *Cleanse and Purify Thyself* (1994), Anderson states that "cooked, frozen, canned and processed foods . . . drain the life force from the body." In Chapter 9, he describes "a profound Divine experience" wherein a female "Divine Being" filled him with "information." He states that purification is a "guaranteed entrance" into heaven and that people who are willing to purify themselves "shall have the help of God's mightiest messengers and, if necessary, legions of angelic beings."

Colorpuncture™ (colorpuncture system, Osho esogetic colorpuncture system): Combination of "Energy Emission analysis" (Kirlian photography) and a form of color therapy. German naturopath Peter Mandel, who developed "esogetics" (see below), named the system. "Treatment" involves application of colored light, with a device that resembles a penlight, to "acupuncture receptors" in the skin. According to colorpuncture theory, color is "life energy" that carries "healing information," and acupuncture meridians convey this information to the cells and organs that need it.

Dimensional clearing: "Process" allegedly designed to clear the human "energy field" of "external elements" that are not part of the self, such as "Lost Souls," "Thought Forms," and "fragments" of other people.

Directed esoteric toning: Form of toning (see "BioSonic Repatterning™," above) that posits a "spiritual self," *chakras, prana, kundalini,* clairaudience, and clairvoyance.

Esogetics: System developed and named by German naturopath Peter Mandel and practiced at the Mandel Institute in Bruchsal, Germany. It reportedly is the "science of bio-energy," whose "levels" range from the material to the esoteric. One of the premises of esogetics is that colored light transmitted by acupuncture meridians tends to heal specific forms of disease and dysfunction.

Flower essence therapy: Enlargement of Bach flower therapy (see above) pioneered in the 1970s by Richard Katz, who founded in 1979 the Flower Essence Society (FES). The system involves purported intake of "flower essences"—"subtle liquid extracts" whose alleged active ingredients are "life forces" from wildflowers or "pristine" garden blossoms.

Harner Method Shamanic Counseling (HMSC): Admixture of classic shamanism and the work of author Michael Harner, Ph.D., founder and director of the Foundation for Shamanic Studies. The purported thrust of HMSC is problem-solving by divination. Supposedly, practitioners ("ordinary reality HMSC counselors") serve merely as facilitators, and sacred teachers in "nonordinary reality" are the "real" counselors.

Healing touch: "A way of moving energy around" manually, according to a 1995 edition of "The Other Side." Therein, an alleged beneficiary of the method stated: "It feels like having a complete massage without being touched." The method posits an "energy field."

HealthWatchers System™: "Specialized application" of Biological Immunity Analysis™ (see above) to weight management. Its centerpiece is the HealthWatchers Analysis™, a purported test of urine and saliva for "the physical and emotional frequency" of an individual's "Stress Pattern." HealthWatchers System®, a mail-order house in Scottsdale, Arizona, defines "Stress Pattern" as "the resistance created by People, Places, Circumstances and Events attracted to you because they are opposed to your Soul Pattern"; "Soul Pattern" as "the pattern inherent in your Soul. . . . the point-of-view from which you are able to see and express life when you are free from your "Stress Pattern"; and "Soul" as "the immortal, spiritual, moral or emotional nature of a human being."

Ho'oponopono: Reputed ancient Hawaiian process whose alleged main purpose is discovery of the "Divinity" within oneself. Apparently, this supposedly enables removal of "the internal cause" of stress. The method purportedly: "releases" problems and "blocks" that cause "imbalance," stress, and "disease" in "the self"; brings peace and "balance" through a physical, mental, and spiritual "cleansing" that involves repentance and "transmutation"; and creates "balance," freedom, love, peace, and wisdom within individuals (and other social entities) and the "Universe." According to the Foundation of I, Inc., in Mamaroneck, New York, Ho'oponopono "can be used for animate and inanimate objects" and "on any problem or situation."

Johrei: Supposedly purificatory method that defines the Johrei Fellowship, a worldwide interfaith association with a center in Manhattan. Purportedly, sessions take about 20 minutes, do not entail physical contact, and are always free of charge. The term *Johrei* also refers to a paradisiacal doctrine and to an alleged something that, through the focusing of "Divine Light," naturally eases physical and mental distress. Japanese businessman Mokichi Okada founded the movement in 1935. Okada allegedly had learned "God's Divine Plan" for the "New Age" through a series of divine revelations. Johrei's principles include the "Law of Purification," which holds that sickness is simply "Nature's" way of restoring health, and the "Law of Spiritual Affinity," which holds that innumerable "spiritual cords" dominate human existence. Another principle is that one's health and material resources are functions of one's "spiritual condition."

Karuna reiki (formerly called Sai Baba reiki): Form of reiki named and taught by "Reiki Master" William Lee

"The 'Law of Purification' holds that sickness is simply 'Nature's' way of restoring health"

Rand. Rand is the author of *Reiki, The Healing Touch;* founder of the Center for Reiki Training in Southfield, Michigan; and editor-in-chief of *Reiki News,* a quarterly published by the center. Reiki is a variant of the laying on of hands. *The Reiki Handbook* (1992) describes it as a "healing art" whereby therapists channel *reiki,* "universal life energy power," through their bodies for storage in the solar plexus, and into "dis-eased" individuals for "rebalancing." The Sanskrit word *karuna* is translatable as "compassionate action." The purported focus of karuna reiki is development of *karuna.*

Laserpuncture: Technique involving application of a laser beam to acupuncture points.

Mentalphysics: Purported practical, wholistic, futuristic science and "super yoga" founded in 1927 by the Reverend Edwin J. Dingle, an English journalist and publisher who died in 1972. Mentalphysics supposedly brings out the "hidden meaning" of the Bible and reportedly involves "astral travel"; aura reading ("aura study"); chanting; *jin shin jyutsu* (a variant of *shiatsu*); medication (including guided meditation); *pranayama* ("deep scientific breathing exercises"); "pranic therapy" (a variant of channeling); reflexology; shiatsu; and individualization of diet according to "chemical type."

Nutripathy: "A religious science of experiencing mental, financial, physical, social and spiritual health using specific universal laws," according to *Nutripathy . . . The Key to Your Prosperity, Success and Spiritual Fulfillment* (1984). Gary A. Martin, D.N., Ph.D., Th.D., D.Sc., originated the system in the late 1970s, allegedly thanks to divine influence. It involves hair analysis ("mineral analysis from hair") and a variation of Bach flower therapy (see above). Its premises include the following: (1) God is in everyone. (2) One's "True Self" is God ("Love"). (3) "Proper nutrition" and realization of one's "true identity" together make for a perfect life.

Pranic psychotherapy: Application of pranic healing to psychological ailments. Pranic healing is a form of "paranormal healing" promoted by Dr. Choa Kok Sui. It posits chakras, meridians ("bioplasmic channels"), and an "energy body" that consists of an "inner aura," an "outer aura," and a "health aura." Pranic psychotherapy includes four "healing techniques" besides those of pranic healing: (1) an "advanced cleansing technique," purportedly for the removal and disintegration of "traumatic psychic energy" and such; (2) an "advanced form of energizing," purportedly for the disintegration of "negative elementals" ("bad spirits") and the repair of "etheric webs" that lie in a one-to-one relation behind chakras; (3) activation and inhibition of chakras; and (4) creation of a "positive thought entity" for the patient. In *Pranic Psychotherapy* (1993), Sui states: "Flicking your hand has to be done frequently when energizing in order to efficiently eliminate dirty energy."

Rei-so (spiritual diagnosis): Pseudodiagnostic method whose apparent main premise is that dead people, in the form of spirits (interpretable as consciousness, energy, or vibration), can influence living people who had an intimate relationship with them. Supposedly, spirits create darkness in the "auras" of people they are affecting negatively.

Shinkiko: Allegedly "the ultimate healing art from Japan," an "intuitive medical science" founded by Masato Nakagawa, Ph.D. Similar to *Qigong, shinkiko* purportedly involves therapeutic application of *Shin-ki* ("healing-energy"). Supposedly, Shinkiko "therapists" can tap a "limitless universal energy source." Proponents recommend the system for many health problems, including AIDS, cancer, cholecystitis, cirrhosis, deafness, glaucoma, hepatitis, and nephritis.

Sonopuncture: Technique involving application of ultrasound to classical acupuncture points.

Spiritual midwifery: Childbearing philosophy promoted by Ina May Gaskin in her book of the same name. It posits "spiritual energy" that is "Holy," indivision of humanity ("We are all One"), *shakti* (divine female "energy"), and God. Moreover, it euphemizes contractions as "energy rushes" and postulates that "a husband and wife form a single energy unit."

Stress pattern processing℠: "Modality" whose centerpiece is the Health Watchers Analysis™ (see "Health Watchers System™," above). One of its premises is that humans are "electrically driven" spiritual beings.

Subtle aromatherapy: Form of vibrational healing (see "Vibrational medicine," below) promoted by Patricia Davis in her book of the same name. "Aromatherapy" refers to any application of essential oils that is purportedly for beauty or health. Essential oils allegedly can restore "balance" and "harmony" not only to one's body but also to one's life. "Subtle aromatherapy" refers to any use of essential oils with the purported objective of: (1) healing the "physical body" by affecting the "subtle body" ("energetic body"), or (2) contributing to personal and spiritual growth.

Swedish-Esalen: A "light/relaxing" and "nurturing" form of massage. It allegedly reintegrates the body and soul.

Vibrational medicine (vibrational healing, energy medicine, subtle-energy medicine): "Healing philosophy" whose main tenet is that humans are "dynamic energy systems ("body/mind/spirit" complexes) that reflect evolutionary patterns of soul growth." Its premises include the following: (1) Health and illness originate in "subtle energy systems." (2) These systems coordinate the "life-force" and the "physical body." (3) Emotions, spirituality, and nutritional and environmental factors affect the "subtle energy systems." Vibrational medicine embraces: acupuncture; aromatherapy (see "Subtle aromatherapy," above); Bach flower therapy (see above); "chakra rebalancing"; channeling; color breathing; color therapy (chromotherapy); crystal therapy; distant healing; EAV (Electroacupuncture According to Voll); flower essence therapy (see above); homeopathy; Kirlian photography; laserpuncture (see above); the laying on of hands; mesmerism; moxibustion; orthomolecular medicine; past-life regression; psychic surgery; radonics; the Simonton method; sonopuncture (see above); toning (see "BioSonic Repatterning™," above); Transcendental Meditation®; and therapeutic touch. □

China, Chi, and Chicanery

Examining Traditional Chinese Medicine and Chi Theory

PETER HUSTON

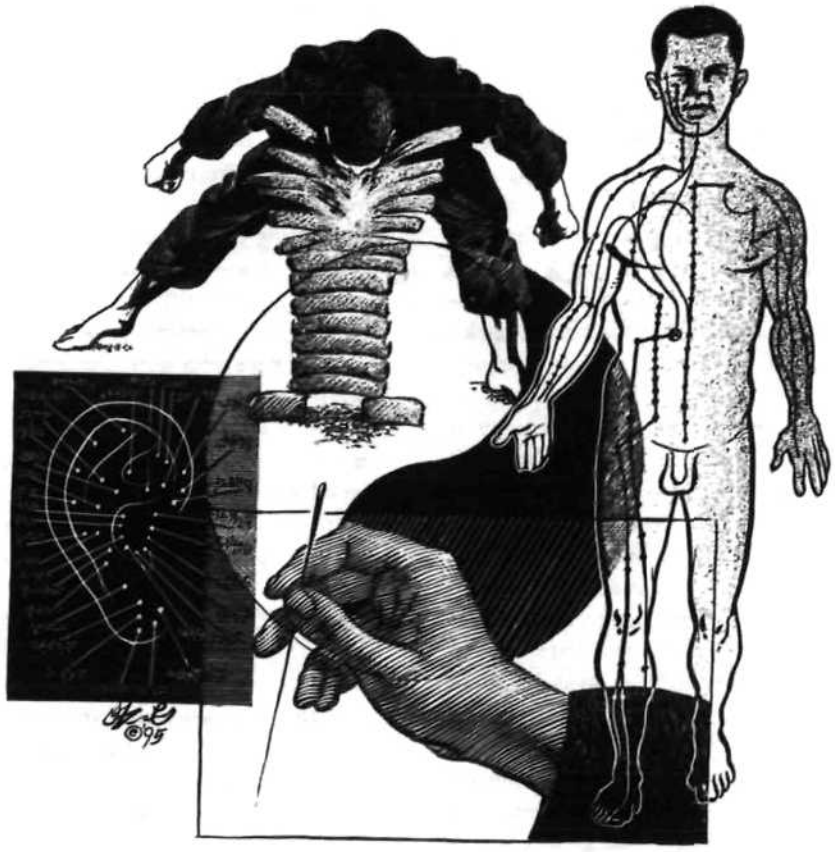
Traditional Chinese medicine is thousands of years old and has literally more than a billion satisfied customers. Many of its treatments and teachings are based on the effects of Chi, a mystical form of bio-energy.

Today in America, traditional Chinese medicine is undergoing something of a rebirth. Although at first this seems curious, from a historical perspective and seen in hindsight it is really not much of a surprise. The history of Sino-American relations is in part a story of Americans looking to the East and interpreting a huge, complex, and, to an outsider, confusing culture in such a way that they see what they desire or fear the most. Like a cosmic Rorschach test, China has been many things, including the Yellow peril, the Red peril, and paradoxically a land full of loving workers united in harmony and living in communes. During the Depression to many "the China market" was going to save us and our economy. Ronald Reagan once referred to China as a "so-called Communist country," when in fact it actually was (and still is) a Communist country.

Today, many people, often with good reason, are apprehensive about modern scientific medicine. Although it is undoubtedly one of the most effective forms of healthcare ever seen on earth, there is little doubt that modern science has produced a system of care that can be frighteningly impersonal. Too often the patient is reduced almost to the level of a defective machine while being cared for by an overworked staff of specialists with little chance to provide the patient with personal attention or emotional support. Treatments tend to be invasive, frighteningly complex in theory and practice, and seem to function without any input from the patient. The sterile hospital walls, mysterious shots and capsules, and complex machinery seem far removed from how nature intended us to live. Occasionally we read of treatments that cause serious harm, and of cases where impersonal healthcare results in accidental, or sometimes even intentional, tragedies.

It was almost inevitable that many people would look for alternative forms of treatment, and that traditional Chinese medicine (TCM) would be one of them. At first TCM seems to be "just what the doctor ordered." With its long history, many assume its techniques have been proved to work. Others are attracted by its emphasis on gentle remedies made from organic compounds. TCM emphasizes improving bodily harmony and focuses on the growth of Chi energy. Since TCM was a subject of Bill Moyers's recent television series, "The Mind and Healing," which surveyed much of the system's appeal in an interesting manner, I will occasionally cite examples from that show.

The basis of much of TCM's teachings lies in the manipulation of Chi, supposedly one's life energies. It is nearly impossible to give a definition of *life* without somehow mentioning "energy." With few, if any, peculiar exceptions, to be alive means to create, use, and exchange energy. This energy is of many different sorts. For instance, we are dealing with one sort of chemical process when we digest our morning bowl of breakfast cereal. We use a different sort of energy when our muscles are activated to throw a basketball. And when the brain creates small amounts of electricity to pass down to the nerves and stimulate the muscles and the heart to contract, this electricity is created by a large number of small cellular microbatteries inside the skull.



Gerald Fried

But this is a new and relatively unnatural way for humans to see themselves. To the ancients it seemed natural to hypothesize that the energy of life was a single and quite special sort. This idea continues to flavor some of our popular notions when we speak of a "life force"or when we refer to a person who appears vibrant and energetic as being "full of life." The Chinese of ancient times felt, and many if not most Chinese today feel, that there is a special sort of life energy that flows through us and keeps us alive.[1] This energy is called "Chi" or "Qi."[2] According to traditional Chinese thinking, the Chi flows through our body in a rhythmic manner, and most acupuncture and acupressure methods employ stimulation of points that lie along the acupuncture "meridians" through which Chi is said to flow. When one manipulates an acupuncture point, the traditional explanation for any effect that occurs is that it is caused by an alteration of the flow of Chi under that point.

In TCM, the notion of Chi and Chi-flow is probably the single most important concept. If a patient is feeling weak and lethargic, then a healer will embark on a course of action that he or she feels will increase the patient's flow of Chi. He will do this according to carefully taught ancient techniques. Treatment options might include changes in diet, a prescribed course of exercises, massage, herbal or other

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organic medicines, and perhaps techniques like acupuncture, although Westerners should keep in mind that these are only one small part of the overall system. There is also the more esoteric belief that through the manipulation of Chi one can ultimately learn to perform superhuman feats and display miraculous powers. Claims for these powers vary greatly, some of which make one immediately suspicious, such as telepathic effects, telekinetic effects, invulnerability to injury, and so forth.

There has been considerable interest in the West in the effects and applications of acupuncture anesthesia. A typical, yet highly dramatic exhibition of this technique was shown on the Moyers series. The patient had a brain tumor and needed surgery to remove it. The procedure was performed in what appeared to be an operating room by a Chinese surgical staff. The surgical techniques appeared to be quite up to date, the only addition being the inclusion of acupuncture as a supplement to a greatly decreased dosage of conventional sedatives and anesthetics. The patient remained fully conscious throughout the operation, and Moyers and his travel companion, David Eisenberg, M.D., an American expert on TCM, were allowed to observe the proceedings. Moyers and this home viewer were noticeably impressed.

Yet before wholeheartedly accepting this as a miracle, we have to stop and look back at the procedure to see what it says about the capabilities of the body and the possible role that Chi played in the process. Can science explain this anesthetic effect?

As in so many such cases, we must first define the effect for which we wish to find an explanation. The claims of acupuncture anesthesia cannot be accepted without careful analysis. Acupuncture anesthesia came to the attention of the Western world dramatically when James Reston, the *New York Times* journalist, developed an inflamed appendix while in China in the summer of 1971. Acupuncture anesthesia was used, and this organ was removed in Beijing's Anti-imperialist Hospital (Porkert 1982). The name is significant and typical of the time, for it was during China's notorious period of chaos known as the Cultural Revolution. At this time, ultra-Communist ideology gripped the country. Those who were suspected of "counter-revolutionary tendencies" often found their homes ransacked, their careers ruined, and themselves shipped off to the countryside to "learn from the peasants through labor." The only way to keep oneself alive and remain afloat was to keep one's mouth shut, and when asked a question, to repeat the official party line.[3]

This is relevant to acupuncture anesthesia and the belief that it showed great untapped potential, because it was part of the official party line. To question its effectiveness, even in a scholarly manner, was to risk seeming disloyal and suffering personal injury or disruption of one's career. Whether they liked it or not, many medical practitioners were virtually forced to use and parrot the effectiveness of acupuncture anesthesia regardless of their opinions about its usefulness (Keng and Tao 1980). Needless to say, this is counterproductive to good scholarship. Since it was during this period that interest in TCM began to develop in the West, it is not surprising that many books from this period were translated into English. Some are still in print, and few question the efficacy of the techniques described in the texts.

Although it was impressive that, during the operation on the Bill Moyers program, the patient was fully conscious and alert, this is relatively standard practice in many types of brain surgery in both the West and China. By keeping the patient conscious, the surgeons are able to carefully monitor the effects of their work and the stimulation of various portions of the brain. Furthermore, the amount of pain considered to be tolerable by a human being varies greatly from culture to culture (Baker 1990). It is probably safe to say that modern Americans expect little pain and modern Chinese routinely tolerate more discomfort than does the average world citizen. Speaking from personal experience, I've seen (and felt) Taiwanese general practitioners perform foot surgery, treating both an infected puncture wound and an ingrown toenail with amazingly little anesthesia and a surprisingly loud patient. (I was one of these patients, and the doctor found it quite funny that I screamed when having a little thing like a scalpel cut into my foot.)

But to some extent these are peripheral issues. Although the effects of acupuncture anesthesia are undoubtedly exaggerated, few doubt that it does in fact have an effect. Can science explain this without resorting to Chi theory? The scientific explanation lies in the "gate theory." According to this theory, the nerve is gently stimulated by insertion of a needle. This gentle stimulation prohibits the passage of stronger pain signals down the same nerve and produces an analgesic effect (Lu and Needham 1980).

But it is important to understand that acupuncture anesthesia is only a small, but dramatic, part of the overall uses of acupuncture. And acupuncture in turn is only a small part of TCM, a unified system of healthcare. It is a holistic system of healthcare that is based on ancient ideas about how the human body works. Often these concepts are in conflict with modern science, but it seems fair to say that despite this, at least some of its treatments do provide relief or cures for some afflictions. Among its treatment modalities are changes in diet and lifestyle, herbal and other medicinal treatments, exercises, and stimulation of various points on the human body through various means.

"It is a widespread belief that one who has trained extensively in Chi gong can produce effects that . . . often seem to defy the laws of science."

There are a variety of points on the human body that are traditionally stimulated in acupuncture, and practitioners believe that these points are generally indicative of the underlying flow of Chi throughout the body. The exact number of points is controversial and varies from school to school and historical period to historical period, but most practitioners today probably employ more than 600, spaced relatively evenly over the surface of the human body. Stimulation of these points can be accomplished through various means. The three most common of these are manipulation of the points by hand (called either "massotherapy" or "acupressure"), stimulation by insertion of needles into the points themselves (acupuncture), and stimulation by heat (referred to as "moxibustion" after the herb "moxus," which is normally burned to provide the heat).

Some of these acupoint treatments may work, but it is surprisingly difficult to know with any accuracy which ones do. Ironically, this is due to the mind's ability to affect the health of the body, which is one of the main appeals of such systems anyway. If one places a needle in a person and the treatment works in the way in which the patient believed it would, was the cure due to the needle or the *belief* in the effect of the needle? Naturally, no one can say with any accuracy, and most Chinese consider the point to be pretty much irrelevant just so long as the cure does in fact work through one means or another. With new drugs, tests can be designed that involve substituting inert placebos for a drug, but it is quite difficult to develop a test that resembles acupuncture that does not, in fact, involve sticking needles into people.

The ways in which treatments involving acupuncture points are believed to work can be described in a scientific framework, e.g., stimulation of nerves, counterirritation treatments, stimulation of the body to produce its naturally occurring chemical compounds, and belief. Sometimes scientists can learn about the modality of effect by the speed at which the effect occurs, or about the influence of belief by experimentation on animals (and some acupuncture treatments do in fact work on animals). It is generally not considered necessary by most Western practitioners to invoke Chi as an explanation.

A variety of exercises are designed to improve one's Chi, and therefore one's health. One common example is Tai Chi Chuan, best described as a sort of slow-motion kung fu. It does seem to have many positive health effects. A variety of exercises known collectively as "Chi gong" are somewhat similar. Still these effects can be described without invoking Chi theory. Since such exercises generally include a mixture of low-impact isometrics and stretching exercises, the physical health benefits should be obvious. As for mental and spiritual benefits, these can be explained in two ways. One is the simple fact that regular exercise is good for one's mind and promotes a feeling of physical well-being. More interesting perhaps is the proved effect that meditative-type mental-relaxation exercises can have on one's health. It has been proved that if one forces one's mind to relax, then one's blood pressure, respiratory rate, and so on, are reduced. Herbert Benson, a medical researcher, has termed this effect the "relaxation response," and meditation is said to be one of the most effective means of producing it.[4] Since Tai Chi Chuan and other Chinese exercises do involve systematic mental programs of mood and mind training, it is only natural that they should produce this relaxation response among practitioners.

It is a widespread belief that one who has trained extensively in Chi gong can produce effects that take place outside the body and often seem to defy the laws of science. Unfortunately for believers, these feats are rarely, if ever, performed under properly controlled conditions. To the best of my knowledge, these effects have not been proved to occur in such a way that they cannot be explained by our current understanding of science. In some cases, for instance, when martial artists break concrete or wood, they may believe that they are using Chi when in fact the feat is quite explainable within physics as we understand it.[5] Invoking Occam's razor, that the simplest solution consistent with the facts is more likely to be true, we are once again left without evidence of Chi.

Other feats are much more difficult to explain and require the services of a qualified magician to help design control conditions. When such conditions have been provided, the effect of the Chi power again disappears, leaving little or nothing to support the existence of these powers. A 1988 CSICOP delegation to China provided such tests, and without exception remarkable powers failed to manifest themselves (Kurtz et al. 1988). Sociologist Marcello Truzzi (1985) had a similar experience. I viewed a report on a supposed test of Chi gong-inspired psychokinesis in Taiwan, and I was appalled at just how poorly designed the test was. This response was doubly felt since I had just finished reading James Randi's *The Truth About Uri Geller*. The parallels were simply overwhelming.[6]

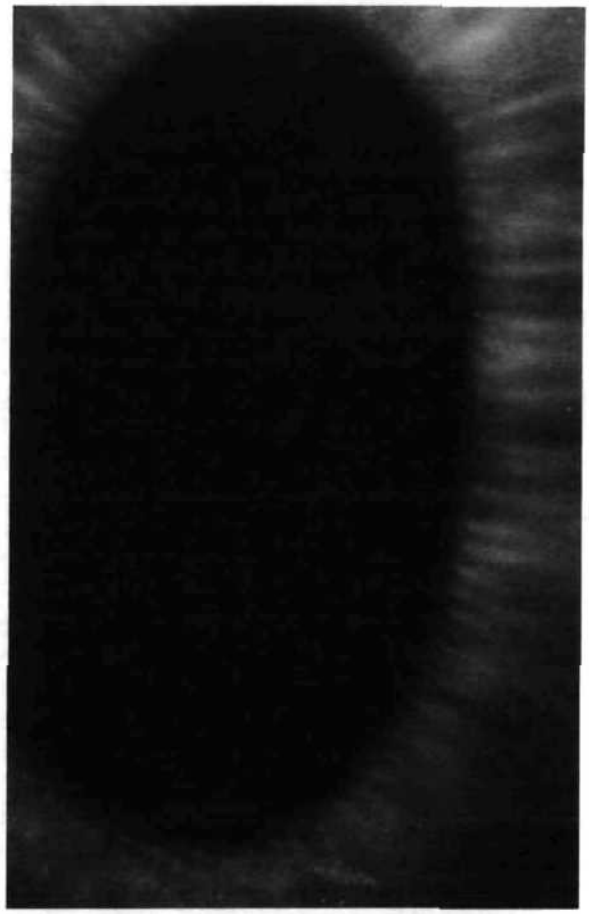
These powers, as alleged proof of Chi, were shown in the Moyers series in a segment in which Moyers viewed a Chi gong teacher known as Master Shi. In a dramatic episode, Master Shi allegedly demonstrated his control over Chi by such acts as pushing over large numbers of students with one hand, and in turn not allowing himself to be pushed over when a large number of these same students shoved him in unison. In a particularly dramatic incident, one of the students, an American studying in Beijing, attempted to pick up and throw Master Shi, but met with no success.

I have watched this Moyers sequence carefully about a half dozen times to see if there was any evidence of fakery on the part of the students or the teacher. I have noted the following: Different students when pushed by the same wave of Master Shi's hand fall and roll different distances. Similarly, the students have different expressions on their faces. As they are thrown back, some grimace as if the experience was

unpleasant, while others laugh and seem to enjoy it. Meanwhile, Eisenberg seems somewhat unimpressed by these performances. The American student then announces that he is going to try to pick up his Chi gong teacher and throw him down on the ground. He explains to Moyers that he really does want to do this, while Master Shi, who presumably speaks no English, looks on with apprehension from the background. The student then slides into throwing position and grasps the teacher's arm. His body trembles with the apparent effort of this attempt at a throw. Meanwhile Eisenberg yells, "Try harder. You look like you're faking." The student's foot begins to flop around like a dying fish, supposedly to show just how much effort he is evincing in this attempt to throw this man to the ground. Ultimately, he gives up and announces that Master Shi is reversing his energy through his use of Chi gong and that it is in fact humanly impossible to pick up and throw his teacher.

I offer the following comments, which should supplement Eisenberg's ("You look like you're faking"). Most Asians, particularly a Chi gong instructor, are quite concerned with face and image. If one is interested in his teacher's saving face, then it is quite important not to bounce him on his head on international television. If you do so, then the teacher might, at the very least, not teach you anymore. Second, I have found myself in many situations where I have been required for one reason or another to lift people up off their feet and into the air (ambulance attendant, hospital orderly, rock-concert security guard, older brother, happy uncle, etc.). Step one in picking up another person is pretty much always to make sure that you have your feet firmly planted on the floor, or else you both might land on your faces as you fall over. It would seem that before we accept this segment of the Moyers program as cause to revamp Newton's laws of motion, we should at the very least conduct a few controlled tests to see if the student just might have been trying to make his instructor look good in front of Bill Moyers. I'll leave to someone else the mechanics and ethics of designing a double-blind test to see if a martial-arts student can throw a non-Chi gong master more easily than a Chi gong master.

Having surveyed the evidence so far, there seems to be little evidence of substance that supports the existence of Chi. Although some, including myself at times, find this quite disappointing, it is really not too surprising when we look at the extent of the claims and the way science works. Science and scientific theories and knowledge don't just happen arbitrarily. They are developed based on careful observation and testing over the course of many years, if not generations. Chi theory states that the function of the human body is based on a system of energy that circulates throughout all other existing systems and integrates with them all. There is no evidence that such a system exists. Similarly, if such a system does exist, but for whatever reason has managed to avoid detection by science, then it would seem logical that there would be large and sweeping gaps in our knowledge of human physiology every time we examined a system that the Chi interacted with. In other words, if Chi controls and influences the behavior of the human body, and we have not detected Chi, then the existence of Chi would be conspicuous by its absence. Personally, I believe that further study of traditional Chinese medicine should uncover many valuable things, such as some useful herbal treatments. I also believe that modern medicine and healthcare have many problems that should be looked at seriously and possibly fixed. Despite these, it is important to examine any body of knowledge critically before employing it for anything as important as healthcare, and this includes the traditional arts and sciences of other cultures. If one wishes to truly understand something, one must be willing to look beyond the explanation traditionally presented. To be truly open-minded, one must be willing to step beyond the boundaries and limitations that have been inherited. To pursue the truth, you must be willing to consider the teachings that cultures have to offer, but you must also hold those teachings up to careful examination.



Although many believe the "aura" around this Kirlian photograph of a thumb shows Chi, Kirlain photography does not act like Chi. (See Watkins and Bickel 1989; and 1986.)

Notes

1. Actually this life force, Chi, is believed to flow through everything that exists in varying amounts, not just living matter. The study of how Chi flows through landscaping and living environs and how it can be manipulated to ben-

Chi continued on page 58

Sexpols, Orgone Energy, Cloud Busters, and Bions: Remembered, but Not Relevant

HENRY H. BAUER

Beyond Psychology: Letters and Journals, 1934-1939, by Wilhelm Reich. Edited by Mary Boyd Higgins. Farrar, Straus and Giroux, New York, 1994. 256 pp. Hardcover, $25.00.

To appreciate the significance of *Beyond Psychology: Letters and Journals, 1934-1939, by Wilhelm Reich,* one needs to know a bit about Wilhelm Reich. According to the Concise Columbia Encyclopedia (1991, Microsoft Bookshelf version):

> Reich, Wilhelm, 1897-1957, Austrian psychiatrist and biophysicist. He broke with Freud, fled Nazi Germany, and later settled in New York City. He emphasized the importance of sexual fulfillment for personal well-being. Later, he argued that sexual success depended partly on orgone energy. The orgone box, a device he invented to restore energy, was declared a fraud by the Food and Drug Administration. He died in prison while serving a two-year sentence for contempt of court and violation of the Food and Drug Act. He became a hero of student radicals of the 1960s, with their motto "make love, not war."

Fuller appraisals of Reich range from pro (Boadella 1973; Greenfield 1974; Mann and Hoffmann 1980; Reich 1969; Sharaf 1983) to anti (Gardner 1957). Colin Wilson's (1981) work shows gullibility toward Reich's scientific claims but is less of a hagiography than Reichians might like. Certainly Reich was an appreciated leader among Freud's acolytes into the 1920s. Certainly Reich's insights into character development and the relation of somatic to psychological tension are still drawn upon. But, certainly too, mainstream science continues to ignore or reject orgone and all Reich's claims regarding biology.

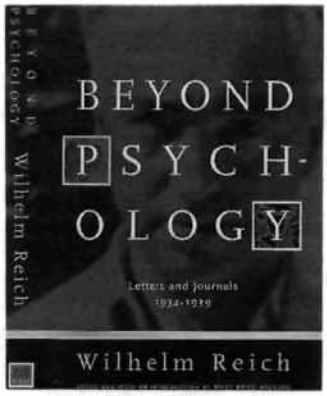
Reich's emphasis on the role of proper sexual functioning as a matter of "social" importance led him to political activism and association with the Communist Party and away from Freud and the psychoanalytic mainstream. But Reich was too individual a thinker to remain welcome for long among the Communists, and in the 1930s he became a loner. Later, in Scandinavia, he gathered some followers to his psychotherapeutic approach and ventured into experimental biology. Reich came to believe that he could produce living cells (*bions*) from inorganic materials and that he had discovered a universal life-force, *orgone energy,* that he could manipulate in *orgone boxes* for healing purposes. Reich wrote, "Orgone is a type of energy that is the opposite of electricity; it is the specific form of biological energy" (p. 199).

When scientists as charismatic as Reich or Immanuel Velikovsky (who conducted controversial cosmological research) die, the adherents typically split into competing sects. Editor Mary Boyd Higgins notes that in "the confusion that followed Reich's death, his archives were stolen. Although a legal action forced the return of most of his material, some documents are still missing." The largest remaining group of Reichians is the American College of Orgonomy, P.O. Box 490, Princeton, NJ 08542; (908) 821-1144, fax 821-0174. It sponsors lecture series and workshops and publishes a newsletter and the *Journal of Orgonomy.*

In 1939 Reich moved to the United States, settling eventually in Rangeley, Maine, where his home is open to the public as the Wilhelm Reich Museum. There Reich continued his research, conducted workshops, and invented the cloud buster, an array of tubes that, properly grounded and focused on the skies, would supposedly bring rain.

Increasingly Reich felt himself a target of opposition. He found signs of what he called a "negative" or "deadly orgone-antagonist energy" (DOR) in many places. He believed UFOs were attacking earth and tried to fend them off with orgone. When charged with illegal interstate commerce with the orgone boxes, he acted as his own attorney and was convicted.

His multifaceted life, made of stages that might even seem to describe different people, naturally has brought more than one interpretation. I see him as an extraordinarily talented and charismatic man who could not stand back from his ideas nor benefit from criticism. Rather than meet the criteria and standards of existing journals and publishers, he founded his own journals and published his own books. I see Reich as the textbook example of Martin Gardner's diagnosis of pseudoscientists as *hermit* scientists: a cogent illustration that what makes science sound is peer interaction within a disciplined community, a dire warning to us all of what can happen if we become so sure of being right that we pay no attention to the criticisms of competent, informed others. In that view, probably the most irreversible step Reich took was to believe that he could produce life in the test tube, thereby ignoring the conclusion, reached many decades earlier in science, that cellular life no longer arises spontaneously on Earth. Wilhelm Reich took that fatal step during the mid-1930s.



That the editor's admiration of Reich is uncritical is revealed, for instance, in the overblown description of Reich's "grounding in basic science": [He] "had come to psychoanalysis . . . [having] studied astronomy, electronics, the quantum theory, and the physical theories of Einstein, Heisenberg, and Bohr" (p. viii). But the chronology (Reich came to psychoanalysis soon after World War I) makes it impossible for him to have studied several of those sciences. One may also suspect the validity of a judgment that Reich's "two books for children . . . were received enthusiastically by the young" (p. xix).

Certain passages in the book make it plain that Reich was ignorant of much of the science in which he regarded himself as competent: "24 February 1937— . . . So far it has not occurred to anybody to carry out truly concrete tests and to determine what Brownian movement really is" (p. 97). "My experiments with lava and iron explain the origin of spores. The process involved in a spinning wave seems to illustrate Einstein's $E = mc^2$ formula, like throwing barbells with unequal sides" (p. 165); "the glass electricity was found to be positive and the resin electricity negative" (p. 202); "sand is solar energy that at one stage solidified" (p. 204). Reich never shied away from rejecting expert opinion if it disagreed with his own: that "Kreyberg, the cancer researcher . . . has diagnosed staphylococci" is waved aside (p. 114); "the best modern experts in bacteriology cannot argue with me on the basic problems of my clinical experience and my specific experimental work. . . . I claim absolute authority in all questions of sexual functioning and its relation to vegetative life" (p. 117). Such confidence was Reich's even prior to study of the relevant field: "A practical formulation of the spinning-wave theory will constitute the second step. For that I'll have to study mathematics" (p. 206).

That attitude is typical of "hermit scientists." So, too, is a penchant for citing or accepting other unorthodoxies. When Reich thought to detect radiation from some of his bions, he also "saw a connection . . . [with] Gurwitsch mitogenetic rays" (p. 213).

This book shows Reich formulating grandiose and all-encompassing theories on the basis of flimsy indications at best. For example, the interpretation of "experiments with rubber electrodes applied to the erogenous zones of vegetatively highly sensitive individuals" would be anything but straightforward, considering just the conductivity of skin and its dependence on moisture. Yet those are the sorts of measurements Reich made "to confirm his hypothesis that sexuality is identical with a bioelectric charge and that the orgasm is fundamentally an electrical discharge" (p. xxi). That notion was based in part on "his clinical observation of a four-beat process in the orgasm which he called the "tension-charge (TC) or orgasm formula: mechanical tension → bioelectrical charge → bioelectrical discharge → mechanical relaxation" (pp. xxi-xxii). "The tension-charge law . . . [also] seems to control the mitotic process of cell division" (p. 6). "27 May 1935—The experiments were completely successful—the electrical nature of sexuality has been proved!" (p. 47). "6 May 1936— . . . Do amoebae (motile plasma) really originate from the swelling, formation, and dissociation of inorganic matter?" Yes indeed: "17 May 1936—Living earth! The preliminary stages of life discovered! . . . *Vesicular disintegration of inorganic and organic matter + swelling → life.* Protozoa are the result of reanimation of organic material that has become inorganic!!??" (p. 65). "15 June 1936—There is no

"Rather than meet the criteria and standards of existing journals and publishers, he [Reich] founded his own journals and published his own books."

The importance of this book is that it makes public for the first time Reich's private writings from that pivotal period. Readers of this book must, however, be willing to adapt to the Reichian jargon of "vegetative," "vasovegetative," "sex-economic," and "Sexpol."

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question about it: The motile structures . . . are inorganic matter *that is coming to life*" (p. 66). "20 November 1936— . . . No doubt about it. I'm right. 'Migratory cancer cells' are amoebic formations. They . . . demonstrate the law of tension and charge in its purest form . . . My intuition is good. . . . Was absolutely driven to buy a microscope. The sight of the cancer cells was exactly as I had previous imagined" (p. 76). "1 September 1937— . . . It is clear that the transformation of grass into protozoa is the model for the formation of cancer" (p. 110); "cancer is essentially a complicated sequela of dysfunctional sexual energy" (p. 122).

Some passages seem downright megalomaniacal: "the future of mankind is at stake" (p. 57); "for the sake of the cause, one must become increasingly lonely" (p. 58). "It's incredible how stupid and petty, how unconscious the arguments against spontaneous generation are. . . . In fifty to one hundred years they'll idolize me" (p. 77). "Galileo Galilei! . . . I thank my destiny that it has included me in the ranks of these great fighters" (p. 206). "I do not keep a diary for the same reasons an adolescent girl does but because these notes on my remarkable existence may someday be of use" (p. 215). "I have also learned to accept injustices without bearing grudges" (p. 29). "There are few people around who can match my self-discipline in understanding and tolerating other people" (p. 31).

Trouble with followers and lovers reveals Reich in an unsympathetic light, as when he writes to his wife that, "Otto circulates these silly letters, plays like a small child at being an organizer, and has no idea what it is all about. . . . [He is] an unconsciously hostile friend" (p. 7). As soon as an expert helper fails to accept Reich's ideas, he becomes non grata and wrong (p. 54): "I don't believe that Löwenbach is bringing enough objectivity to bear on the matter; instead, it looks as if he deliberately did everything he could to slow the experiments down" (p. 55). It is always his lover's responsibility to cater to his emotional needs: "Unless you provoke me too much, my love for you will enable me to find the necessary patience" (p. 32). "There is nothing I can do," Reich wrote, when his wife Elsa's analyst "cannot cope with Elsa's neurosis because she [the analyst] would like to be my wife herself, in place of Elsa" (p. 82). "For love of Elsa I went without Gerd [one of this girlfriends] last summer. For love of Elsa I went to other women in order not to distress her with my desire" (p. 128). Reich seems to have practiced as he preached, that sexual fulfillment is of the utmost importance, as when he recalls "six ghastly weeks of abstinence, interrupted only by emergency measures" (p. 246).

If Reich was paranoid at the end of his life, as the events suggest, then there were also signs of it much earlier: "From a distance I am beginning to smell an attempt, albeit unconscious, to alienate me from the children" (p. 44). "My isolation seems inevitable. People . . . feel resentful because I see through them. . . . Like insects, they are attracted to the flame of my knowledge while fearing it" (p. 115). In 1937 Reich feared the reaction of "the cancer radium industry" if his "method of cancer treatment were to succeed . . . [but] it would be wrong to claim that my behavior is paranoid" (p. 131).

"Certain passages in the book make it plain that Reich was ignorant of much of the science in which he regarded himself as competent."

Since this book focuses on the critical years during which Reich became irrevocably isolated from mainstream organizations, this review has emphasized evidence of that isolation and those aspects of Reich's personality that may have inclined him in that direction. But one can hardly understand from so one-sided an emphasis the enormous appeal Wilhelm Reich has had for many highly intelligent and competent people. He had qualities that we all tend to admire, such as great strength of character, the confidence of knowing what he was about, and passionate pursuit of questions of evident importance and wide interest. When a person like Reich, in his later years, strays so far out as to become intellectually irrelevant, that is surely a human tragedy, not an indication that he was flawed or irrelevant from the beginning. In a few places, even in this unflatteringly revealing book, one can glimpse the force of Reich's character. When he desperately needed a passport to go from Scandinavia to the United States, he nevertheless refused on principle to accept one issued by the German Embassy because it bore the stamp "Jew" and gave his name as "Wilhelm Israel Reich" (that stamp and the insertion of "Israel" having been standard under the Nazi regime). Doubtless it was the same egotism that led Reich, again to his mind on principle, to defy the Food and Drug Administration.

This book provides copious support for those who would debunk Reich's scientific pretensions, and Reich's attitude—especially perhaps toward women—as he comes across as notably self-centered and altogether not very nice. Yet the book was put together for publication by an admirer, as the introduction plainly shows. So we get insight not only into Reich but also into his followers, and into how skeptical perspective is lost once allegiance has been lent.

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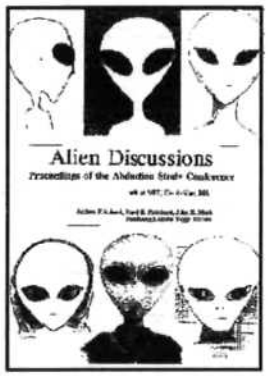
GORDON STEIN

Close Encounters of the Fourth Kind: Alien Abduction, UFOs, and the Conference at M.I.T. By C. D. B. Bryan. Alfred A. Knopf, New York, 1995. 477 pp. Hardcover, $25.00.

Alien Discussions: Proceedings of the Abduction Study Conference Held at MIT, Cambridge, Mass. Edited by Andrea Pritchard, David E. Pritchard, John E. Mack, Pam Kasey, and Claudia Yapp. North Cambridge Press, P.O. Box 240, Cambridge, MA 02140. 1995. 683 pp. Hardcover, $69.95.

Alien Discussions is the proceedings (papers and discussion) of the Abduction Study Conference at M.I.T. in 1992. *Close Encounters of the Fourth Kind* is a report by novelist C. D. B. Bryan of his impressions of the conference, which he attended as a reporter. The results are quite different when one views the conference from the two perspectives. For example, Bryan tells us that two documents were required reading beforehand by participants in the conference: David Jacobs's *Secret Life* and folklorist Thomas Bullard's paper "On Stolen Time." The latter is a sort of statistical summary of characteristics of abductees and abduction scenarios. The Jacobs book is definitely pro-abduction (although it tries to maintain a scholarly distance—unsuccessfully—from endorsing the phenomenon). The Bullard paper is probably an accurate statistical summary, although it implies the certainty of abductions in a subtle way. The *Proceedings* themselves never mention this required reading. They also are misleading about the entire makeup of the invitees. Although the writings of skeptics (in the CSICOP sense) are mentioned repeatedly in the *Proceedings,* the only attendee from CSICOP's ranks was Robert Sheaffer. No others were invited, as I understand it, to this "by invitation only" meeting.

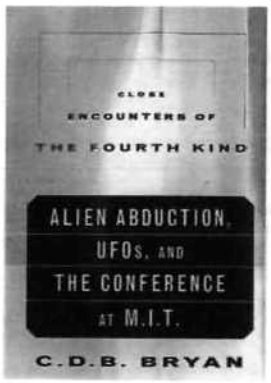


The *Proceedings* volume is an expensively produced report of what is perhaps the most important conference ever held about the purported abduction of humans by aliens from UFOs. Many of the participants in the conference were Ph.D.s (20, mostly psychologists); and there were five physicians. Most of the attendees were either specialists in the UFO field (on the pro side) or claimed "abductees."

Because of the highly unusual nature of the claims of the abductees, there is strong need for good objective data on these incidents, something that has so far been largely lacking. The consistency of the stories told by the abductees is such that they *appear* to be having some sort of experience, but whether this experience is purely psychological is far from clear. Many of the papers in the *Proceedings* volume may help shed some light on this problem, although few could be called hard science contributions. Most are social sciences pilot studies. They indicate directions for future research studies.

The quality of the papers in the *Proceedings* volume varies tremendously (perhaps as might be expected). Some are quite good (e.g., Hufford and Bullard), some are just OK, while a few are simply garbage. The reader can make his or her own specific judgments on these. None resolves the basic problem of whether abductions are real "kidnappings" or not. Many of the flaws in the data are pointedly underlined when (as Bryan describes) there is a strong protest by many of the scientists at the meeting that the infamous Roper survey given to people to see how many had the "abductee experience" was poorly and unscientifically designed. Since such pro-UFO writers as Budd Hopkins had a large role in the development of the survey questions, perhaps this again underscores the fact that nonscientists should not be attempting to do scientific research.

The *Proceedings* volume is marred by false starts, sloppy research, poor editing, and factual errors, but it has some real contributions. Many years down the road, it may well be looked at as one of the pioneering volumes that started the work that eventually led to the solution to this mystery.



The Bryan book provides a needed balance to the omissions of the other book. It gives lots of "outside the conference" talk, often between the participants and Bryan, providing a flavor that can't be otherwise obtained. On the other hand, Bryan has filled out his book with much information taken, as he acknowledges, from J. Allen Hynek,

Timothy Good, Keith Thompson, and John Mack's books. Some of this is pro-UFO material.

What seems to be the problem with Bryan, in general, is that he simply does not have enough background in the enormous UFO literature to be able to evaluate it objectively. It takes years to read enough and be in a position to have some grasp of the entire field. One simply cannot become an instant expert.

In addition, Bryan does not have the background to evaluate statements made to him by Linda Moulton Howe and many others. He simply reports the statements, with no critical evaluation. There is a lot of talk about a required "paradigm shift," without much justification for such a drastic step. The same caveats apply to the many post-conference interviews that the Bryan book contains. His conclusion section seems to show a sort of naivité about the literature that should raise cautions. □

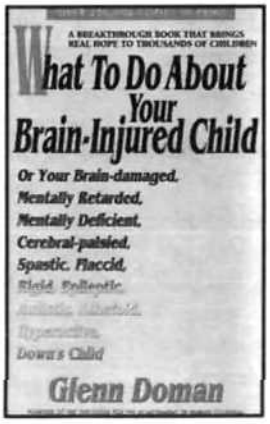
Gordon Stein is a physiologist, author of ten books, and director of the Center for Inquiry Libraries.

Recycling Questionable Treatments

TERENCE M. HINES

◀ *What to Do About Your Brain-Injured Child, or Your Brain-Damaged, Mentally Retarded, Mentally Deficient, Cerebral-Palsied, Spastic, Flaccid, Rigid, Epileptic, Autistic, Athetoid, Hyperactive, Down's Child.* By Glenn Doman. Avery Publishing Group, Garden City Park, N.Y., 1994, xv + 294 pp. Paperback, $11.95.

One of the most characteristic features of a questionable treatment is the claim that it will be effective for several different disorders, each with different pathophysiological causes. Given this, the title of the book by Glenn Doman reviewed here is a dead giveaway: *What to Do About Your Brain-Injured Child, or Your Brain-Damaged, Mentally Retarded, Mentally Deficient, Cerebral-Palsied, Spastic, Flaccid, Rigid, Epileptic, Autistic, Athetoid, Hyperactive, Down's Child.* Most of the conditions listed in the title have totally different causes. For example, Down's Syndrome is caused by chromosomal abnormality and is expressed in a characteristic pattern of changes in IQ. By the time the patient is in his or her late 30s, neuropathological and neurochemical changes in the brain similar to those of Alzheimer's disease occur. The neuropathology of autism, however, is totally different, consisting of cellular changes in the cerebellum as well as certain other brain areas. To make matters worse, several of the disorders listed in the title are themselves mere labels for groups of different disorders with different causes. Thus, there are several causes for mental retardation and mental deficiency. Even epilepsy is a complex group of related disorders differing in cause, underlying neuropathology, and appropriate treatment. To suggest that all these disorders can be treated in the same manner is absurd.


A BREAKTHROUGH BOOK THAT BRINGS REAL HOPE TO THOUSANDS OF CHILDREN
What To Do About Your Brain-Injured Child
Or Your Brain-damaged, Mentally Retarded, Mentally Deficient, Cerebral-palsied, Spastic, Flaccid,
Down's Child
Glenn Doman

One would expect that an author proposing a treatment for brain-damaged children would have a sound knowledge of neurology, neuroanatomy, and brain function. Alas, Doman seems to have only a nodding acquaintance with these areas. The book is chock full of the most egregious errors in these fields. For example, in the "Developmental Profile" in the center of the book, the brain area called the "pons" is said to be responsible for "outline perception." This is simply wrong. Outline perception is a complex function carried out by portions of the visual cortex, a fact that has been known since at least the 1960s. Actually, the pons has no visual function whatsoever. On page 56 the pons is also credited with being "responsible for controlling trunk and limb motion to move the body in crawling motions with the belly on the floor. Therefore, the pons was responsible for crawling." Wrong. While motor fibers that are used to control body movements pass through the pons on their way from higher brain structures down to the spinal cord, the pons is in no way responsible for these movements. To argue that it is, is like arguing that a telephone cable is responsible for transforming spoken speech into electrical impulses simply because those impulses happen to travel through the cable.

Neurological howlers like these should make it clear that Doman has almost no real knowledge of the field in which he is attempting to be an expert. It is rather as if someone proposed a new way of repairing almost anything that could go wrong with an automobile, but confused the steering wheel with the carburetor.

Having said all this, it is important

to discuss just what the therapeutic approach taken by Doman (and his Institutes for the Achievement of Human Potential) actually is. The basic idea is that the brain develops sequentially from lower anatomical structures (like the medulla, pons, etc.) to higher ones (like the cortex). This is another example of Doman simply being ignorant of basic neuroscience. The brain does not develop in this manner. Nonetheless, based on this erroneous view of neurological development, Doman proposes that all sorts of different types of brain damage result in a "blockage" of neurodevelopment at some particular level. Doman says that the "blockage" may be only partial and that in many cases there is a way around the "blockage." This is accomplished by various types of bizarre training procedures. One example concerns the case of 10-month-old "Mary" (p. 151) who is "for all practical purposes deaf," although she does show a startle reflex to sound—showing she's not deaf at all. To overcome Mary's blockage, the therapy will take advantage of the normal startle reflex. Specifically, Mary's mother will "stimulate her auditorially every waking half hour. . . . Mother will do so by unexpectedly banging two blocks of wood just behind Mary's head. She does so ten times at three-second intervals in each of twenty-four sessions" (p. 159). This cruel and useless therapy will likely produce a terrified and anxious child.

Finally, it should be noted that, while this book masquerades as a new title, it isn't anything of the sort. Doman published a book in 1974 with an almost identical title. The only difference in the title of the "new" book is the addition of "Down's Child." The actual contents of this "new" book consist of nothing more than a page-by-page reproduction of the text of Doman's 1974 book. The only changes are the addition of a new title page, new Library of Congress cataloging-in-publication data, and a few pages at the end listing other related publications by Doman and his colleagues and information on the Institutes for the Achievement of Human Potential. The text itself has not been changed one bit, in spite of advances in the knowledge of neurology and specific criticisms of Doman's claims over the 20 years since the 1974 book was published. The failure to change claims in the face of evidence that they are false is another common characteristic of pseudoscientists. □

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Biology of Real Sea Monsters

GORDON STEIN

◀ *Monsters of the Sea.* By Richard Ellis. Alfred A. Knopf, New York, 1994. 429 pp. Hardcover, $30.00.

Cryptozoology is the search for previously unknown animals. Yet Richard Ellis's *Monsters of the Sea* is only partially a cryptozoological book. It deals with sea creatures (although it slides over to lake creatures as well). It has chapters on the Loch Ness monster, sea serpents, and mermaids, but most of the book is spent on straight description of the known biology of the whale, giant squid, manatee, octopus, and shark.

True, until recently the manatee, giant squid, and some forms of shark were unknown creatures to the extent that they might have been considered a part of cryptozoology. Readers of this book, however, should be prepared to be disappointed if they are seeking something strictly about unknown and poorly known sea creatures, but readers who are interested in seeing how a species can move from unknown to known will be delighted.

There is a lot of straight biology here. Some of it, specifically the chapter on the manatee, is fraught with redundancies. But the language is not too technical for the average educated person to understand, and for that Ellis is to be thanked. There certainly is more information here than I ever wanted to know about the squid and the octopus, which seem to be Ellis's favorites. Some people, though, may be fascinated by these two unusual types of animal.

An interesting feature of this book is the way in which Ellis shifts back and forth from biology to literature. The efforts of H. G. Wells, Jules Verne, Herman Melville, and Peter Benchley (among others) to describe whales, sharks, and giant squid in their works are examined. Melville comes off fairly well in the accuracy of his description of whales (he was a whaler for a while), although white (albino?) whales are not known. Jules Verne may have been very accurate in his ability to predict inventions in the future, but he apparently did not do his homework with regard to the then-known biology of the creatures he wrote about.

The movies made from the novels of these authors take things another step away from reality. Perhaps you

could call it "dramatic license," but movies based on the Verne novels, for example, make so many errors that they are almost pure fiction. The reputations of the squid and octopus seem to have suffered (they are actually mild-mannered and not hostile to humans). The information provided on the literature and films about sea creatures is a useful part of the book.

Ellis includes a large bibliography of the materials he has consulted, almost at the level of that of a scientific journal article, which might scare some people off. Overall, the book is a mixed bag, but should appeal most to the person who has a serious interest in some of the more unusual creatures of the sea. □

Fortune-Telling and Other Thefts

PETER HUSTON

◀ *License to Steal: Traveling Con Artists, Their Games, Their Rules—Your Money.* By Dennis Marlock and John Dowling. Paladin Press, Boulder, Colo. 299 pp. Hardcover, $30.00.

If there are those who question whether fortune-telling can be considered a predatory crime, this book should change their minds. Unfortunately, it also has serious weaknesses. Written by Dennis Marlock, a police fraud investigator, and John Dowling, an anthropologist, *License to Steal* covers the lifestyle, crime patterns, and confidence games employed by a criminal element among the Romani people (a.k.a. "Gypsies") and other traveling vagabond groups. Eleven of the thirteen chapters deal with Romani crime bands. The remaining two deal with the Traveller Clans. According to the authors, the "Traveller Clans" are tightly knit, insular, hereditary groups of Scottish, Irish, and English descent who have resided in the United States for many generations and make the bulk of their income through traveling confidence swindles similar to those perpetrated by the Gypsy groups (although fortune-telling does not seem to be common among them).

The two chapters likely to be of most interest to readers of this publication deal with fortune-telling. They detail in explicit and angry style just how such businesses operate. According to the authors, few Gypsy fortune-tellers actually believe in fortune-telling, and virtually all of them would be ridiculed by their peers if they ever actually requested to have their own fortunes told. The daughters of such fortune-tellers (an exclusively female occupation among Gypsies) the authors note, are trained in cold-reading techniques from an early age through both clandestine and open observation of their mothers' chosen trade. A good Gypsy fortune-teller divides her clients into three categories.

The first are those who are seeking light entertainment. The second are desperate people without much money who seek reassurance, attention, and support. The authors say a competent fortune-teller will provide these people with what they seek, and they will be satisfied customers.

The third category is desperate people with lots of money. In such cases, a fortune-teller may engage the client in an elaborate confidence scheme. Often this will lead to a declaration that the victim is suffering from a terrible "curse." Evidence of this supernatural trauma will often be provided through sleight-of-hand tricks, such as "removing evil spirits with an egg" or "changing urine into blood."

Although this is not a text on conjuring, the book describes in detail how these and similar effects are performed. When the time comes, the con artist/fortune-teller will often instruct the victim to turn over large sums of money, valuables, or credit cards for "magical curse removal." Of course, in most cases the fortune-teller simply disappears, as do the valuables. (For one example of such a scam, see "Long Prison Terms for Fortune-Tellers in Connecticut Case," in the Fall 1990 SKEPTICAL INQUIRER.) Upon discovery, many of those who have been taken by a swindle based on fear of supernatural curses are too embarrassed to report the incident to law-enforcment authorities.

In most of the remaining chapters the authors give detailed descriptions of a variety of confidence swindles—black-topping scams, roof-repair swindles, simple burglaries, elaborate shoplifting ploys, and other crimes frequently used by Gypsy criminals. In some cases, illegal baby-selling, and black-market adoptions, for example, the authors describe how fortune-telling might be employed as an adjunct in some schemes to manipulate the victim. But in most cases the crimes do not involve an alleged supernatural element—simply deceit. Because of the fear of law-enforcement involvement, most swindlers rarely use violence in committing such crimes.

For this reason, and others, these swindles rarely get the attention they deserve.

Unfortunately, although *License to Steal* has many strengths, it also has many faults. One is a somewhat defamatory tone throughout much of the work. Although in the introduction and epilogue the authors take great pains to differentiate between the Gypsy (Romani) people in general and the Gypsy (Romani) criminals, throughout most of the chapters they fail to maintain this distinction. Quotes like this are common: "Gypsies are opportunists, and automobiles provide an abundance of avenues to illegal wealth. They exploit every avenue brazenly, audaciously, and ingeniously" (p. 168).

In many places the authors do not seem to have done their homework. They describe some Gypsies as speaking "Yugoslavian," when Serbo-Croatian is the more proper term (although they quite clearly state that Gypsies live in a wide variety of Eastern European countries). Frequently and consistently, the authors quote newspaper articles at length without giving the source or date. Footnotes are provided in a haphazard and irregular manner, and in some chapters (e.g., those on Traveller Clans) not a single footnote is given.

The case of Sherri Kaye Diamond (multiple aliases) provides an example of further problems. Sherri Kaye Diamond, known locally in my area of Schenectady County, New York, as "the shrimp lady," was a traveling con artist arrested for "returning" food to grocery stores. Although she would first telephone for permission to return the items for refund, she would merely lift suitable goods from the shelves and at no point purchase them. In effect the store would pay a "refund" on items that were never purchased. When she was caught in the act, it was discovered that she and her mother had made hundreds of thousands of dollars performing such scams throughout the country.

The case is described with names and aliases provided, but not the location of the crime or a reference or source. If it were not for the fact that it was a local case, I would not have been able to check the facts. When I did, I discovered that although the authors describe Diamond as a Gypsy, the detective I spoke to at the local police station said he had dealt with her frequently during the prosecution of the case and had never heard her referred to as a Gypsy. He was not aware of her exact ethnic background, but we established that she was a native English-speaking Caucasian originally from the New York City area. He did say that she lived a vagabond, Gypsylike lifestyle. Given the lack of citations throughout the work, this discrepancy is quite troubling.

In Lamar Keene's classic (and out-of-print) work *The Psychic Mafia,* he states that among fraudulent spiritualist mediums there exists an elaborate network of information exchange, which allows them to "reveal" startling facts that clients do not believe could possibly be known by natural means. Naturally, such mediums do not keep files on everyone in America, merely on individuals who have been known to donate large sums to "spirit mediums" in the past. Marlock and Dowling do not mention whether such a national network exists among the roving, often interrelated Gypsy fortune-telling groups.

If you are looking for a detailed description of a variety of confidence swindles or fraudulent fortune-telling techniques, *License to Steal* is an excellent source. On the other hand, if you like a reliable work describing the lifestyles of vagabond swindlers, this book simply contains too much questionable material to fit the bill. □

Peter Huston is a writer based in Schenectady, New York. His first book, Tongs, Gangs and Triads, *a detailed study of Chinese gangs, secret societies, and underground religious cults, was published this year by Paladin Press.*

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New Books

The Chicken from Minsk. **Yuri B. Chernyak and Robert M. Rose.** Basic Books, 10 East 53rd Street, New York, NY 10022-5299. 1995. 191 pp. $10.00, paper. Presents 100 "infuriatingly challenging" brainteasers in the Russian tradition. The problems teach how to think scientifically and mathematically. Examples: "Special relativity in the tailor shop" and "The platinum planet."

An Encyclopedia of Claims, Frauds, and Hoaxes of the Occult and Supernatural. **James Randi.** St. Martin's Press, 175 Fifth Ave., New York, NY 10010. 1995. 282 pp. $24.95, hardcover. Dubbed "James Randi's Decidedly Skeptical Definitions of Alternate Realities," this is a much-needed handy guide alphabetically presenting hundreds of short entries (typically one to four paragraphs), with cross-references and an extensive index. The topics range over the paranormal, supernatural, occult and mysticism, and fringes of science, including noteworthy people and groups. The information is authoritative and concise. It is also highly readable, as one would expect from Randi. And it has the additional virtue, absent in almost all previous guides, of presenting the skeptical viewpoint. Introduction by Arthur C. Clarke. Highly recommended.

Eve of Destruction. **Eva Shaw.** Lowell House, 2029 Century Park East, Suite 3290, Los Angeles, CA 90067. 1995. 238 pp. $22.95, hardcover. Subtitled "Prophecies, Theories, and Preparations for the End of the World," this book examines our morbid fascination, and in some cases obsession, with our own collective demise. Shaw explores the history of the prophecies, theories, and religious movements that surround preparations for Armageddon. A timely work, with the coming end of the millennium.

Magic or Medicine? **Robert Buckman and Karl Sabbagh.** Prometheus Books, Amherst, NY 14228. 1995. 261 pp. $26.95, hardcover. First U.S. publication of book published by Macmillan in London in 1993 that accompanied a British television series by the same name. The authors look critically at the achievements and deficiencies and the similarities and differences of both conventional medicine and alternative medicine. They argue that healing has always been partly the science of clinical treatment (medicine) and partly an art (magic). Medicine may make the patient *get* well but often it is the magic that makes the patient *feel* well.

The Myth of Scientific Literacy. **Morris H. Shamos.** Rutgers University Press, New Brunswick, NJ 08901. 1995. 300 pp. $27.95, hardcover. A former president of both the New York Academy of Sciences and the National Science Teachers Association thoughtfully argues that universal scientific literacy is a futile goal. He calls instead for emphasizing an appreciation of science, an understanding of technology's social impacts, and the need to use experts wisely in resolving science/society issues. A chapter titled "The 'Two Cultures'—and a Third" includes sections on C. P. Snow and Jacob Bronowski, passive and active resistance to science, the science counterculture, the antiscience-technology movement, antiscience fringe groups, Jeremy Rifkin, and the power of the press in scientific illiteracy and literacy.

Urantia: The Great Cult Mystery. **Martin Gardner.** Prometheus Books, Amherst, NY 14228. 1995. 445 pp. $25.95, hardcover. The first book-length critical examination of the Urantia cult and its massive "bible," *The Urantia Book*, published in 1955 under the direction of cult leader William Sadler. The book is the largest work ever said to have been channeled by unseen higher beings through human contacts. Gardner discusses the cult's beliefs, critically examines the book itself, including the flaws in its scientific content, and reveals two major developments that threaten to splinter the movement.

—Kendrick Frazier

QUOTEWORTHY

The Scientific Addition to Common Sense

"The principle of the scientific method, in fact, is only a refinement, by analysis and controls, of the universal process of learning by experience. This is usually called common sense. The scientific addition to common sense is merely a more penetrating analysis of the complex factors involved, even in seemingly simple events, and the necessity of numerous repetitions and controls before conclusions are established. Where laymen, as a rule, do not understand or apply the scientific method is in the matter of controls. Thousands of honest errors have been committed and ludicrous conclusions promulgated by failure to understand the necessity of controls."

—Anton J. Carlson, "Science and the Supernatural," *Science*, February 27, 1937

Articles of Note

Garnett, Leah R. "Homeopathy: Is Less Really More?" *Harvard Health Letter*, 20(7):1-3, May 1995. A low-key, balanced description and evaluation of homeopathy.

Jaroff, Leon. "Weird Science." *Time*, May 15, 1995, pp. 75, 78. Strong critique of how new shows catering to viewers' growing appetite for the paranormal obliterate the line between fact and fiction in a "a fast-growing TV genre that rivals the most irrepressible supermarket tabloids in promoting pseudoscience and the paranormal." Scholars and scientists are quoted about the harm the shows can do. Shortly after this article appeared, Will Miller, host of NBC's daily "The Other Side," one of the shows skewered for hokey reenactments and weird sensationalism, quit the show.

Keinan, Giora. "Effects of Stress and Tolerance of Ambiguity on Magical Thinking." *Journal of Personality and Social Psychology*, 67(1): 48-55, July 1994. Questionnaires assessing different types of magical thinking and ambiguity were administered to 174 Israelis who, during the Gulf War, resided in areas that were either exposed (high-stress conditions) or not exposed (low-stress conditions) to missile attacks. Magical thinking emerged more frequently in subjects under high-stress conditions. Also, high-stress levels exerted more pronounced effects on emergence of magical thinking in persons with low tolerance of ambiguity than in those with high tolerance.

Sagan, Carl. "What TV Could Do For America." *Parade Magazine*, June 4, 1995, pp. 12-14. Lively critique of TV's treatment of science, characterized by mad scientists and credulous, sensationalized pro-pseudoscience pseudo-documentaries. "Where, in such programs, are the joys of science? The delights in discovering how the universe is put together? The exhilaration in knowing a deep thing well?" Sagan says modern society desperately needs solutions to problems that require deep understanding of science and technology. "I do not think many youngsters will be encouraged toward a career in science or engineering by watching Saturday-morning TV—or much of the rest of the available American video menu." He presents constructive suggestions for how TV could improve the public knowledge of science.

Shalit, Ruth. "Witch Hunt." *New Republic*, June 19, 1995, pp. 14-15. Review of the Fells Acres Day School case in Massachusetts, as a result of which Violet and Cheryl Amirault are in prison for up to 20 years, apparent victims of the hysteria over multiple-victim abuse cases at day-care centers and questionable interviewing techniques and investigative methods that suggested to the children the testimony the authorities wished to elicit.

Simpson, Richard L., and Brenda Smith Myles. "Effectiveness of Facilitated Communication with Children and Youth with Autism." *Journal of Special Education*, 28(4): 424-439, 1995. A 15-week study evaluated the utility and validity of facilitated communication. Students were unable to correctly respond to questions the facilitator lacked answers to.

—Kendrick Frazier

"When the Skeptical Inquirer arrives, I always take it home from the office and pore through its pages, wondering what new misunderstandings will be revealed. I'm always amazed that there's still another subject that I never thought of." —Carl Sagan

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Science Without Adjectives

RALPH ESTLING

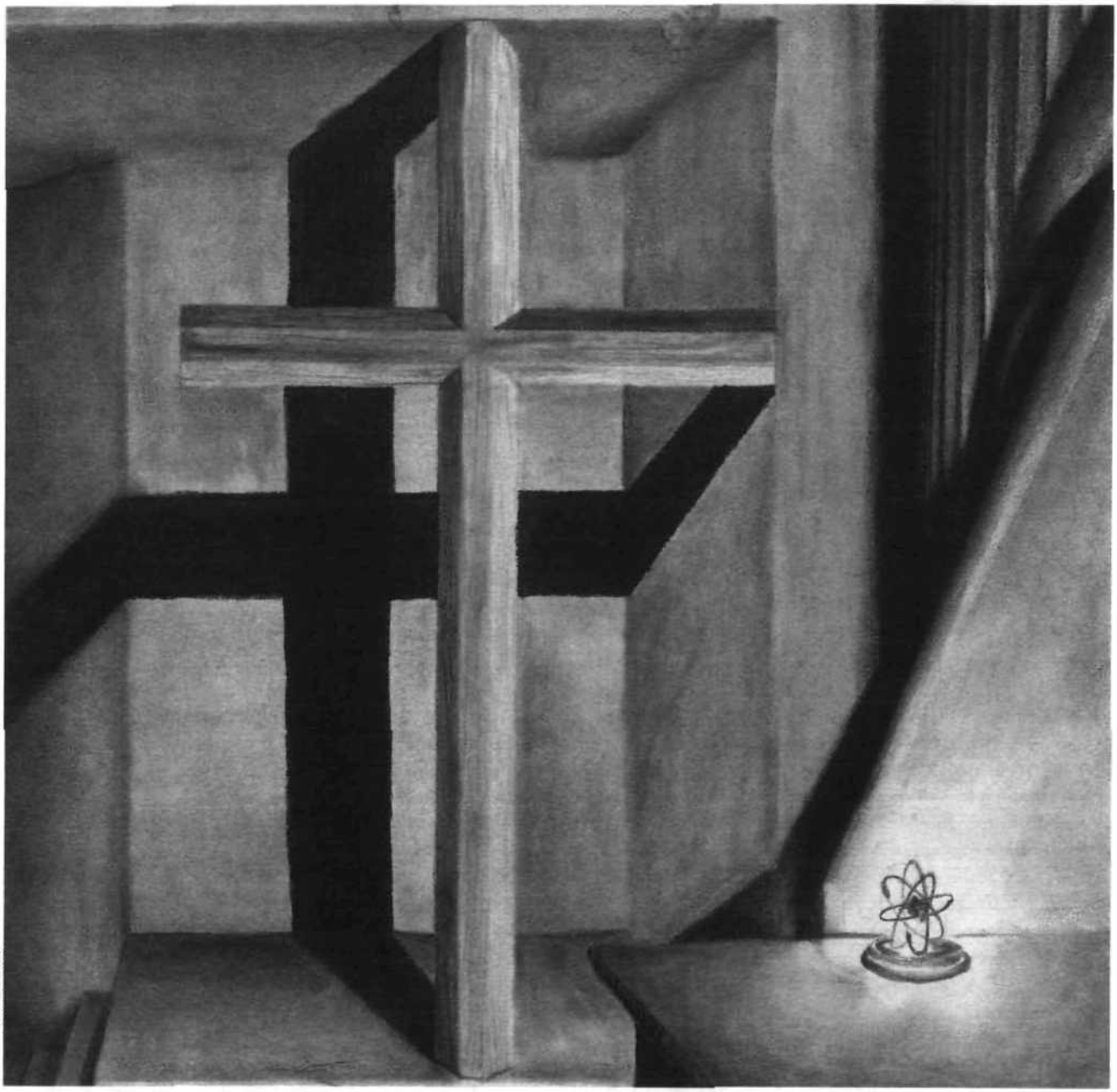
Like April snow, a small flurry of letters has recently fluttered down upon me. Many of them are on the general theme of an individual being "a good scientist" and "a good Christian" simultaneously. Sir Isaac Newton was mentioned as a case in point: He denied the divinity of Jesus, although he was sensible enough not to do so too publicly. (True, some Anglican bishops seem inclined toward embarrassed ambiguity about some of the more outré aspects of Christianity nowadays, but 300 years ago, the Church of England was a bit more set in its ways.) People accept the deathbed conversion of Charles Darwin from riotous atheism to meek belief; we are constantly being told that Galileo was, at heart, a good Catholic and that Einstein, deep down, was a worshipper of the God of his fathers.

The question of whether, and how much, a scientist's personal outlook on life reflects on his or her science is important, but the particular significance of the individual case has to be taken into consideration. We have, and have had, scientists who are devout Christians of all denominations, Jews, Jehovah's Witnesses, Muslims (Sunni and Shi'ite), Hindus, Buddhists (Far Eastern and Californian), agnostics, atheists, Nazis, Marxists, Keynesians, monetarists, socialists, liberals, Tories, Democrats, Republicans, as well as those politically, socially, and economically uninformed to the point of idiocy. Some are very good scientists, while others, only so-so, and some are very bad, indeed. That is to say, some are able to keep their professional and personal attitudes totally separate, with a strict policy of mutual noninterference; others less so; and yet others, not at all. I wish I could be more definitive, but the truth has this vague, casual sloppiness about it that has always irritated some people.

Of course, we are free to argue over the morality of such double-think, such self-induced split-brain techniques, whereby half holds fast to the textbook rules governing biology and the other half to the Virgin Birth; one cortex harbors within its convolutions both the intricacies of astrophysics and the staying of the sun upon Gibeon and the moon in the valley of Ajalon; while the same skull houses and protects within its limited confines both a knowledge of geology and the certainty that Earth is no more than 10,000 years old; and all these fit snugly, without any jostling. We can argue over the intellectual honesty involved—in fact, I'm sure we should—but the ability to have two mutually contradictory convictions, two belief systems, each fervently and unquestioningly held, that are manifestly incompatible and intellectually unpermissible, has rarely caused a scientist to lose a wink of sleep. More to the point, the effect on his or her science varies from none at all to complete and total, including the gamut of everything in between. So it all seems to depend on the particular scientist you have in mind and how well his or her particular double-think meshes.

Think about Philipp Lenard and Johannes Stark, both Nobel laureates in physics, and champions of "Aryan science" even during the days of the middle-of-the-road, pre-Third Reich Weimar Republic of Germany. Lenard edited a book titled *110 German Scientists Against Einstein,* by which he meant, against "Jewish science," causing Einstein to remark with a sigh, "If I had been wrong it would only have needed one."

Another Nobel laureate in physics from Germany, Werner Heisenberg, stayed behind in Germany after the Nazis had taken over—Einstein never forgave him for this—and worked on the German atom bomb. Keen minds still dispute whether he stayed in order to build a bomb for Hitler or to see to it that it wasn't built. I wonder if Heisenberg knew. Carl Jung (Swiss psychologist and psychiatrist) and Konrad Lorenz (German-Austrian Nobel laure-



James Becker

ate in physiology/medicine) each had nice things to say about Nazism while it prevailed, but after the war, each abjured. Trofim Lysenko (Soviet biologist and agronomist), J. B. S. Haldane, and Frédéric Joliot-Curie were all dedicated Marxists (Haldane later gave it up for Hinduism). Of these six, four were excellent scientists, one a crank materialist, and one a crank mystic. I've no idea what all this proves about Nazism, Marxism, and science, separately or in combination. Perhaps all it proves is that scientists are pretty much like the rest of us, muddleheaded about some things.

Perhaps it's time we stop talking about American science, British science, Japanese science, Aryan science, Jewish science, Marxist science, Christian science (except for Christian Science, of course), Islamic science, atheist science, creation science, or any other kind or denomination of science, and just talk about good science and bad science, which are the only kinds that matter.

Perhaps we should emulate the eminent professor of surgery Ernst Ferdinand Sauerbruch. When in the mid-1930s a Brownshirted stormtrooper stomped noisily into his lecture hall at Berlin University, complete with jodhpurs, riding boots, spurs, and swastika armband, Sauerbruch paused in his lecture until the stormtrooper thumped himself down in the front row and then said sweetly to him, "Thank you, *Herr Kollege,* for leaving your horse outside."

Perhaps it's time we all left those clumping boots, jangling spurs, armbands, and all those adjectives of science outside, and just concentrate our minds and hearts on the only two science adjectives that matter: *good* and *bad.* □

Randi Sends Grand-Opening Greeting

The following letter from James Randi was read to the attendees of the Center for Inquiry dedication, held June 9, in Amherst, N.Y.

To All Concerned,

I sincerely regret that I cannot be present today at this auspicious event. The birth of L. Ron Hubbard, the landing of the Ark, the religious conversion of Phil Klass, and the ascension to Venus of Shirley MacLaine are all events I have missed, but none so momentous as this. Seriously, folks, I wish I were there.

CSICOP and I have had rough times of late. It's no secret that we've been involved in battling several devastating legal problems and after years of expensive and emotionally charged opposition to those who would deny us the right to speak the truth, we have emerged victorious. The scars are there, but they will heal.

The center provides us with a hub from which we can hope to operate and to advise an even more effective and far-reaching network of organizations that share CSICOP's basic aims. Wounded as we have been, we will endeavor to never again allow the agents of irrationality to damage our efforts to bring the public a clearer picture of what really goes on in a real world.

I'm happy to announce that *Scientific American* magazine will begin soon a new monthly column titled, "The Skeptical American." I'll be the author. This will be my effort to take up where Leon Jaroff had to leave off when he—involuntarily—discontinued his "Skeptical Eye" feature in *Discover* magazine years ago. I have a lot of catching up to do, and both Leon and Martin Gardner have generously offered their advice and assistance to me in this new endeavor.

The scalawags (is that a slanderous or libelous word?) are still out there, folks, and they gain strength every day. The media, in general, support pseudoscience and crackpot notions with callous indifference, looking only at the advertising revenues and seldom at the ethical considerations. We cannot hope to improve their ethics, nor to provide them with a conscience; but we can bring the public to an understanding that lies are easy to sell and are regularly being offered at bargain prices.

The battlefield is huge, the stakes are high, the rules are not in our favor, but we must persevere—and we will. H. L. Mencken wrote: "Hope is a pathological belief in the occurrence of the impossible." We have vigorously denied this pessimistic view, and the creation of this center is material proof of our opposition to such a dismal attitude. At risk of offending both Mencken and Dante, I suggest that a sign might be placed over the door: "Take hope, all ye who enter here."

I congratulate us all on the opening of this enterprise today. We have worked hard to see the doors open, and now, by our continued support, let us offer assurance that they will never close.

I love you all.

In absentia,
James Randi

Dedication of Center for Inquiry Draws 230

The gala grand opening on June 9, 1995, of the Center for Inquiry, Phase II, in Amherst, New York, attracted some 230 well-wishers. The centerpiece of CSICOP's shared headquarters was dedicated by author and entertainer Steve Allen. Also participating were Leon Jaroff, Science Editor Emeritus of *Time;* Herbert Hauptman, Nobel Laureate in chemistry; Stan Lundine, former Lieutenant Governor of New York; *Skeptical Inquirer* Editor Kendrick Frazier, and many others.

Steve Allen

The Center for Inquiry campus now provides 20,000 square feet of office, meeting, seminar, library, and warehouse space that is shared by CSICOP and CODESH (the Council for Democratic and Secular Humanism). The Center has a library complex with a capacity for 50,000 volumes, and houses three special libraries on science and skepticism, freethought and humanism, and American philosophical naturalism.

Representatives from several international skeptical and humanist groups enlivened the event, including Amardeo Sarma, representing Euroskeptics and Mario Mendez Acosta of Mexico's SOMIE organization.

"Nationwide and worldwide, the skeptical movement will benefit from an impressive headquarters institution that includes library facilities, meeting and conference rooms that hold 200 people, audio and video production spaces, and other vitally needed capabilities," said CSICOP Chair Paul Kurtz.

Logic *from page 11*

fuzzy systems. He now teaches electrical engineering at the University of Southern California, Los Angeles.

Kosko is also a karate expert, body builder, music composer, and fiction writer. Politically he is a libertarian. A believer in the future of cryonics—freezing human bodies to resuscitate them later when medical science is more advanced—he made this the basis of his science fiction novella, *Wake Me When I Die.* He was an ardent logical positivist, steeped in the binary thinking of Carnap and Quine, before Zadeh's work overwhelmed him and Kosko moved from black and white to gray. Since then his contributions to fuzzy have been immense, notably his recent work on "fuzzy entropy" and "fuzzy systems."

Kosko is also into Zen meditation. He believes U.S. logicians and manufacturers are still mired in the binary either/or thinking of Western philosophy. By contrast, Southeast Asia, with its Buddhist background, is more tolerant of continuity and vagueness. True, the yin/yang symbol is binary, but each half contains a spot of the other, suggesting the fuzziness of both sides. Perhaps Japanese fuzzians will fuzzify the symbol by fading the white and black sides through a continuum of grays.

Kosko is good at inventing fuzzy phrases, such as "fuzz-up" and "fits" (fuzzy units to replace fuzzy bits, or binary units). Rubik's cube suggested to him a clever way to model fuzzy values as fuzzy points within cubes and hypercubes. He likes to speak of the day he learned that "science is not true"—that is, all its laws are fuzzy.

Fuzzy Thinking is an entertaining tour de force that ranges widely and smoothly over such topics as relativity theory, quantum mechanics, psychology, ethics, philosophy, and even theology. Everything is, of course, fuzzified. "God," Kosko writes in his last chapter, "is He who wrote the math. Or She who wrote the math. Or It that wrote the math. Or the Nothingness that wrote the math.The Mathmaker."

Is fuzzy logic as revolutionary as Kosko and his mentor Zadeh believe? Maybe. □

Consciousness *from page 26*

tremendous advantages for social interactions. The individual can form a model of what it is like to be another person. Such models can be used with great advantage to predict the desires and behaviors of others.

It is not known at this time how consciousness is bound into a field, although there are speculations beyond the scope of this article. Any artifact that can behave like a conscious entity must have some physical operation equivalent to the brain's binding process. Short-term memory is also necessary to sustain the field of consciousness. A moment-to-moment field is equivalent to no consciousness. Memory can hold both noticed and unnoticed parts of the field. We have seen that we cannot have an awareness of an observation until it is remembered. We could have no knowledge of the witness without memory.

Even if we should find the operations that generate the qualitative content of consciousness, the outer, or objective, view of those operations would look quite different. Consider a camera and its shutter action. The shutter action can be photographed in all its stages by another camera, but if the camera photographs its own shutter action by means of a mirror, that action will appear as a blur. Observing the neural action that supports the experience of blueness is not the same as observing blueness. It may not be possible to explain the final nature of conscious experience. We do not expect to explain the final nature of matter and energy. We finally come to the mystery of existence itself.

If we should succeed in constructing an artifact that does have consciousness, we would be faced by some extremely difficult moral problems. Our own system of morals would be meaningless if people had no consciousness. Furthermore, we might find it quite a task to nourish a healthy, balanced psyche in an artifact. The artifact could not have an ongoing viable mentality without constant massive interaction with its external world. Experiments have shown that people's minds begin to show symptoms of extreme disorientation after only a few hours in isolation tanks. The task of creating more than a rudimentary consciousness in an artifact seems very daunting indeed when we consider all the skill, wisdom, and sacrifice necessary to produce a viable psyche in a human creature.

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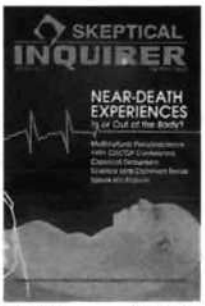

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Chi *from page 42*

efit humanity is known as "feng shui," or Chinese geomancy. Feng shui is still taken quite seriously by many people throughout China.

2. Chinese is, of course, written in Chinese characters and not the Roman alphabet. There exist two commonly accepted forms of Romanization in widespread use and at times the differences in the two systems can result in widely divergent spellings of the same Chinese word. For instance, in previous articles (e.g., Kurtz, et al. 1988) the official Chinese Pinyin system of Romanization was used, resulting in the spelling "Qi." This is the system of Romanization in use in all official documents and is favored for reporting current events in China in the West. Bill Moyers's spelling of "Chi" is from the much older Wade-Giles system of Romanization which is favored in Taiwan and by Western historians. The latter tends to appear more frequently in Western documents regarding the traditional and anomalous Chinese claims. "Ki," the Korean and Japanese equivalent for "Chi," is also frequently seen in the West and appears in words such as "aiki-do" and "hapkido," two interesting martial arts that incorporate Chi theory into their teachings.

3. For a readable account of what it was like to grow up in this period, see Heng and Shapiro, 1983.

4. It should be mentioned that many do not like the work of Herbert Benson. I do. He has a tendency to express an interest in some of the spiritual and theological aspects of the systems that developed the meditative procedures that he studies to an extent that some find distasteful.

5. There has been discussion in these pages in the past as to how and why martial artists insist on breaking things by striking them with their hands, feet, or other body parts. This is done normally to test one's ability or to increase one's self-confidence, although there is a great deal of debate within the many-faceted world of martial arts about what pragmatic use such acts actually have. Although some have suggested that martial artists treat wood and other targets to make them more easily breakable, it is important to understand that in some cases they actually treat materials to make them more difficult to break and thus increase the challenge. Having broken many pieces of wood and other material with my body over the years, I will simply say that, although it is sometimes a silly thing to do, it is also a lot of fun.

6. For those, like me, who have a strong interest in studying alleged Chi powers but lack a thorough background in conjuring and magical effects, I cannot recommend the Leung Tang (1983, 1991) books highly enough. Written by a Chinese magician in Hong Kong (in English) they explain numerous means of recreating the very same effects that many Chinese attribute to Chi gong and other mysterious powers. Unfortunately, these books can be quite difficult to find in the United States, but large martial arts suppliers sometimes have copies for sale. These dealers advertise in martial-arts magazines and elsewhere.

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Letters to the Editor

Is Skepticism Tenable?

John Beloff, in "The Skeptical Position: Is it Tenable?" (*SI*, May/June 1995) suggests that skepticism about anything is warranted only when both experimental and historical evidence can be reasonably dismissed. But if Beloff is right, it is hard to imagine how any claim could be rejected. Consider: I claim to have produced nuclear fusion from a mix of common household products. You request a demonstration. After repeated trials, the only heat I generate is plainly the result of a simple chemical reaction. (OK, so I used a little Drano in my concoction.)

But following Beloff, the game is not lost. You are right, I say, to question the "experimental evidence." But this is only the tip of my evidential iceberg. I have had numerous past successes, many witnessed by friends and neighbors, now unfortunately long dead. I guess I've just lost the right recipe or maybe my touch. Lacking any serious reason to doubt the historical record, I say, skepticism is not warranted. Never mind my experimental flops.

If Beloff is right, it would seem that no claim can be discarded—no matter how bizarre and extravagant and no matter how much experimental evidence accumulates to the contrary—so long, that is, as the claim has a history. No doubt Beloff would dismiss my example as contrived, extreme, and quite unlike the paranormal reports he takes seriously. But where, really, is the difference? Both Beloff and I make our stand against the skeptic on the basis of nothing more than hopelessly untouchable testimony. If anything is contrived, it is, I submit, the standard Beloff asks the skeptic to satisfy.

Steve Carey
Portland, Ore.

Using John Beloff's definitions, I fit into the "de facto skeptic" category philosophically, in that I am prepared to accept the reality of parapsychological phenomena if anyone can ever provide good, scientifically verified proof. However, I've become an "absolute skeptic" in spirit precisely because of history, which Beloff cites.

Quite simply, psychic claims have been around for centuries, and serious studies have been made since the nineteenth century. In all that time, parapsychology has not progressed one bit. Psychics are still trying to invent the wheel, using murky (at best) studies about tiny maybe/maybe-not phenomena and unverifiable anecdotes.

By contrast, in the same period, the sciences have made tremendous progress in almost every field. To name a few major items: Astronomy discovered the universe and the big bang; chemistry developed the table of the elements; geology discovered plate tectonics; physics discovered atomic theory; and biology discovered evolution and genetics. The result has been not only an ever-increasing expansion of the database about the physical world and ever-deeper insights into its phenomena but a flood of usable products, from tiny computer chips to spacecraft to giant dams and electric power systems.

If parapsychology had progressed at the same rate, each person today routinely would be levitating to places instead of driving, using ESP instead of telephones, and avoiding all of life's dangers by precognition. The failure of parapsychology to develop any sort of usable database and validated theories—in short, to go to beyond stage magicians' tricks—after so much time and effort makes it highly probable that nothing is there to be found.

He's also not really correct in saying there is opposition between skeptics and believers. I do not oppose parapsychologists or believers in many other unverified claims, from religions to ideologies to various paranormal ideas. They simply fail to convince me, and nothing requires me to accept their claims—or to put any money into their pockets—in the absence of well-tested evidence.

William Sierichs, Jr.
Baton Rouge, La.

John Beloff presented the question as to whether the "skeptical position" is tenable, offering some insight into why parapsychologists feel they have something more than wishful thinking to examine. He also breaks skepticism into two parts: weak skepticism (which he calls "de facto skepticism") and strong skepticism (which he calls "a priori skepticism").

While others have already commented on his article, I feel that perhaps they were too kind and elected not to point out many further problems with Beloff's article for fear that enumerating all of them would appear to be an attack.

Okay, I'll agree with his bifurcation of skepticism. The existence of these two degrees of skepticism seems reasonable and even directly observable in the real world. What I can't agree with, however, is his suggestion that weak skeptics will turn into strong skeptics by invoking the violation of known natural physical laws as "a fall-back position when de facto skepticism begins to look shaky" (p. 20).

It is my opinion that Beloff is employing the logical fallacy of "begging the question" here. He didn't present examples of when de facto skepticism becomes "shaky." What could a weak skeptic be faced with that would cause him or her to resort to strong skepticism by pointing out the inconsistency of known physical laws? Beloff is doubtless thinking of some "for instances," yet elected not to offer them as examples. I have yet to see a skeptic "fall back" into strong skepticism. Frankly, I've never seen any evidence for any paranormal phenomena that would warrant such a defensive move.

Another question he begs is that there exists evidence for the paranormal. "Let us now consider the more serious challenge from those I have called the 'de facto skeptics,' who claim to have open minds but who demand stronger evidence than anything that has so far been produced." What evidence has already been offered that supports paranormal beliefs? Anecdotal claims are evidence

that people believe in the paranormal. Experimental tests conducted under strict scientific rules have as yet failed to provide evidence that is worthy of being considered positive. So I'm curious what Beloff is thinking of when he suggests that he has evidence for the paranormal.

Lastly, I'm grateful that Beloff elected to present his views and opinions in what could easily be considered something of a hostile environment. The willingness to do so shows that he's very serious in his desires to have the paranormal taken and examined seriously. While he adopts many suppositions as given, I still walk away enlightened from his piece. I hope *SI* will find the space to allow Beloff to respond to his critics and perhaps answer some of our questions.

Frederic L. Rice
Glendora, Calif.

Beloff's invited response appeared in our July/August issue.—ED.

If I get John Beloff's position correctly, he is saying: Parapsychology in the lab is faulty because it is not repeatable; however, historical instances of mediumship are great proof for the existence of psi. This strikes me as a contradiction. Repeating tests made with the mediums of old is impossible. How many years has D. D. Home been dead? Or Eusapia Palladino? Or Florence Cook? Or May Showers? And they have not left any descendants or disciples. Home cannot levitate himself in bright light (dim? none?) for modern-day scientists. Or make accordions play tunes in a cage. Eusapia cannot redo for them the tricks she was *not proved* to fake.

All the other arguments your skeptical respondents made were great, but for me this seems to get to the crux of the matter.

Richard A. Dengrove
Alexandria, Va.

John Beloff's article was thought provoking. Beloff recognizes that individual studies to detect paranormal effects have had inconsistent results, but lauds the technique of meta-analysis, in which the results of several studies are combined, consistently yielding positive results with "astronomical odds against chance." He then turns to the task of designing an individual study, which, when repeated, will consistently give positive results. He gives up, stating, ". . . any prospect of arriving at [this] must seem hopelessly quixotic." But if the meta-analyses are consistently positive, then equally large individual studies would be, too. Yes, this would be a lot of work, but such is science: How many collisions were necessary to reveal the top quark?

Yet, I suspect that large studies would not be as efficacious at producing positive results as meta-analyses, because I suspect meta-analyses have an unfair advantage. That advantage (and this is my point) is that positive studies are more likely to be published, *and thus included in meta-analyses,* than those that are not. The Horton meta-analysis included 28 studies, 12 of which were positive at the 0.05 level. Would that it were that easy to get positive results! (But note that *if* it were, studies a few times bigger would almost *always* be positive.)

I turned my attention from parapsychology some decades ago, but when I was interested, one did not need a formal meta-analysis to sense that positive results increased the likelihood of publication.

Bob Slaughter
Omaha, Neb.

All five short responses to Beloff's pro-parapsychology position do well in presenting our opposing skeptical position. But all five omit a significant comment that is always missing from our skeptical position articles, and which I have long believed should appear in the SKEPTICAL INQUIRER.

Perhaps what I suggest is considered by editors as too impolite and unbecoming for publication. Early in my reading of skeptical position periodicals, I also so believed.

In particular, I now believe that many parapsychologists know that their position is illogical, but also know that their position is too profitable to abandon. Profitable may mean profitable financially, or in prestige, or in inner satisfaction. Consequently, nothing written by the five *SI* Editorial Board members could have been expected to change the position of "one of the most prominent leaders in the field of parapsychology."

I also believe that you and the board members are aware that the immeasurable value of the SKEPTICAL INQUIRER is for those readers who have not yet become prominent or dedicated parapsychologists. But would it be useful in your presentations to suggest occasionally what you all believe, which is that some prominent parapsychologists are aware that their position is illogical but must be continued because of its profitability?

Murray Projector
Claremont, Calif.

I commend the SKEPTICAL INQUIRER for an excellent series on the paranormal. I found the series to be most informative and well balanced. [In the responses to Beloff] Susan Blackmore suggests that psi should not be accepted until there are theories that help to explain more than just the current observations. While I agree this is an admirable goal, I think it is an unreasonable criteria for accepting anomalies (or observations which are contrary to the current scientific understanding) as valid.

For example, at the end of the last century, Newtonian physics was close to explaining all observed phenomena with simple and elegant laws. However, there were a few anomalies (such as the experiments to measure the velocity of light in ether). Had these anomalies been dismissed and not investigated further because they were contrary to current understanding, quantum physics and relativity never would have been developed. While neither quantum physics nor relativity have the same simple elegance as Newtonian physics, they have certainly increased our envelope of understanding of the universe.

In fact, from the material presented in the SKEPTICAL INQUIRER, I have concluded that paranormal researchers have adequately demonstrated the existence of anomalies. To conclude that the 12 ganzfeld studies that achieved statistical significance were the result of falsified or botched efforts seems about as likely to me as many of the Kennedy assassination plots (it really is hard to imagine how that many serious researchers could get it that wrong). The fact that 16 ganzfeld studies did not get these results simply suggests that we do not yet understand the anomalies well enough to regularly get the "expected" results (we don't know what the variables are that need to be controlled to get these results). I will not accept any theory about psi or how it functions until the theory explains the results of all 28 studies; I do accept that there are anomalies that warrant further investigation.

To John Beloff, I would suggest that the traditional double-blind studies are not sufficient when studying the para-

normal. It is possible that the beliefs and expectations of the researcher planning the study need to be considered. I have no idea how a triple-blind study would be conducted, but until then future meta-analysis might consider the biases of the researcher conducting the research.

Brian Carr
Jefferson Valley, N.Y.

'The Belief Engine'

"The Belief Engine" by James Alcock (*SI*, May/June 1995) has long needed careful exposition. The psychology of dogmas and paranormalisms is more pervasive and powerful than usually appreciated.

A much earlier and complementary analysis may be found in *The True Believer* by Eric Hoffer. It deserves a few excerpts:

For the true believer "to rely on the evidence of the senses and reason is heresy and treason. . . . To be in possession of an absolute truth is to have a net of familiarity spread over the whole of eternity . . . no surprises, no unknowns. . . . His sense of security is derived from his passionate attachment, and not from the excellence of his cause. . . . But he finds no difficulty in swinging suddenly and wildly from one holy cause to another. . . . He cannot be convinced but only converted."

Hoffer was not a formally educated man, but a wide reader and a shrewd observer with a great deal of experience with true believers.

Alcock left a minor difficulty behind. He said, "Rationality and scientific truth have little to offer for most people as remedies for existential anxiety. . . ." Hoffer said the same thing, but overcoming anxieties and paranormal doctrines is not a science, but technology—a common confusion. Science is concerned with understanding dynamics. Technology enters when this knowledge is applied to "human problems." Most people are what the sociologist Vilfredo Pareto called "nonlogical" (not irrational). Alcock has described how prospects for changing this must be more modest than we expected (or like).

Bruce Stewart
Biology Department
Southern Oregon State College
Ashland, Ore.

Two articles in your May/June issue state that the human characteristic of leaping to conclusions was caused by evolution. J. P. McLaughlin ("On Leaping and Looking and Critical Thinking") reports, "Our four leaders [Jerry Andrus, Barry Beyerstein, Ray Hyman, and Loren Pankratz] all touched on the evolutionary aspects of thinking, how brain evolution . . . causes us to leap before we look." James Alcock ("The Belief Engine") makes the same argument in his discussion of the "Learning Unit" of the human brain. Beyerstein goes further, saying ". . . hope is an evolutionary advantage."

In my opinion, these are speculations being presented as fact. Evolution is a fact, and it certainly influences aspects of human behavior; but substantial empirical evidence is needed before we can say a complex suite of behaviors was caused by evolution or was selected for. To my knowledge there is no such evidence in this case, and in the case of "hope" I don't see how there could be.

Both Alcock and Beyerstein support their statements with adaptive storytelling, which "shows" a trait to be adaptive by presenting a hypothetical scenario where the trait improves an organism's fitness. Alcock has a hypothetically intelligent rabbit fleeing at the first sound of rustling grass, showing how jumping to a conclusion—there's a predator there—helps the animal survive even if it leads to an incorrect inference. That's a nice story, but I can imagine the same rabbit getting eaten by an eagle who noticed the sudden movement. Telling such adaptive stories doesn't get us any closer to figuring out how a trait actually arose and spread.

I commend Alcock and Andrus et al. for bringing to light a very interesting possible connection between irrationality and evolution. I suggest, though, that we attempt to test this possibility in a rational fashion and not jump to conclusions.

David DeGusta
Laboratory for Human
Evolutionary Studies
University of California,
Berkeley
degusta@uclink.berkeley.edu

I have twice read James E. Alcock's "The Belief Engine" and find it difficult to understand why anyone would devote five pages and some editorial comment to such a fuzzy analysis of the obvious. Alcock divides his "belief engine" into seven separate but interacting "units" that are tied together, he says, to the physical architecture of the brain; and then he describes the "units" in further detail with examples of a rather idiosyncratic kind. He concludes that beliefs are at best pale and distorted reflections of reality. So?

Any of us could have formulated seven other "units" that work as well or as badly as Alcock's seven, and since anything that happens in the brain is tied to the brain's architecture, our seven would be as valid as his. The brain is not as simplistic in its activities as Alcock suggests, and his analysis does not explain his conclusion. It is not that his conclusion is wrong, but that his supporting material is trivial and seems to have been generated ad hoc.

Peter C. Baker
Professor of Biology
Cleveland State University
Cleveland, Ohio

I thank you for the article "The Belief Engine." There can be no more important subject than understanding belief in things that are not so.

Some false beliefs appear to have lives of their own. One can almost understand belief in "possession." It is almost as if a belief that dies in the daytime will arise when the sun goes down. Perhaps the term disease *meme* would be more appropriate.

I look forward to the time when you will publish an article on correcting belief errors in ourselves and help others to do likewise.

Don Latimer
Los Angeles, Calif.

A Young Grand Canyon?

Regarding Timothy H. Heaton's article "A Young Grand Canyon?" (*SI*, May/June 1995), I found it "weak" in arguments.

The New Jerusalem Bible footnotes "Noah's Deluge" as a disastrous flood in the Tigris and Euphrates river valleys that has been magnified to the mythological "Deluge"!

Heaton is primarily criticizing ICR's *Grand Canyon: Monument to Catastrophe*. And, yes, he briefly mentions:

"He [Steven A. Austin] never presents a comprehensive theory of how the Flood took place, where the water came from." Doesn't anyone understand that the "Flood" would require a minimum of forty feet of sea level rise every hour for the 960-hour period in Genesis—approximately 20 feet an hour of that would have been rainfall!

If you use the fundamentalists' belief in the creation of Earth in 4004 B.C., the "Flood" occurred a mere 4,340 years before 1995! If such a "Flood" took place, don't the fundamentalists think there would be ample and significant evidence all over the Earth (including sediment deposition in ponds, lakes, oceans, and caves); and that all glaciers (including the ice sheets of Greenland and Antarctica) would be the same age—4,340 years old? And, that there would have been a complete repopulation of the entire planet by millions of species of everything, in the same period, from just a pair of each "unclean" animal and six pairs of each "clean" animal?

It disheartens me that we need to always defend ourselves from a Hebrew Mythology created approximately 2,500 to 3,500 years before the present. Try to put yourselves in the position of the common Hebrew people then, with whatever little knowledge they had of "science," reread Genesis from their "view," and it's really easy to reconstruct the "six days of creation" from that. If I can do it, you should be able to, too.

Chet Twarog
Rochester, N.Y.

J. P. McLaughlin refers to David Hume as "the English philosopher." In fact Hume was a Scot and a major force in what has come to be known as the Scottish Enlightenment: He could reasonably be referred to as British but he was no more English than were, say, Lloyd George or Benjamin Disraeli.

An obviously more important point is in regard to Timothy H. Heaton's very timely article on creation science ("A Young Grand Canyon?"). Heaton is entirely right to counter scientific argument with scientific argument. Insofar as they cite fact and deploy logic, creationists serve a valuable purpose. But this should not blind us to the fact that to credit the scriptures with authority in these matters is unwarranted and the aim of creationists (which is to support the notion of biblical authority by reference to empirical data) is unsound. The claim that the Bible has anything of value to say in relation to the origin of our world is easily demolished by reading the Genesis stories. These stories contain no reference to those most numerous, those most varied, and those most fundamentally important organisms in our biosphere—the micro-organisms.

An account of the origin of the living world that makes no reference to micro-organisms is about as convincing as a history of the twentieth century that makes no mention of petroleum.

The glaring omission of micro-organisms in the Genesis story is explained very easily by assuming that the writer was a fallible human person who, in particular, had no microscope.

Eric Stockton
Sanday, Orkney
U.K.

The Miracle-Seller

I was delighted to read (*SI*, May/June 1995) that Uri Geller has made his first payment to CSICOP, as ordered by the courts. In honor of his ridiculous lawsuits, and the (we hope) inevitable outcome of the judgment against him, I have composed a limerick:

The psychic, a flashy young feller
(A flamboyant miracle-seller)
Thought he was dandy
'Til he sued Randi
Now he's just poor Uri Geller

David Pitt
Halifax, Nova Scotia
Canada

Sneaking into Journals?

I came across a disturbing comment in Martin Gardner's article on TM (May/June 1995). He writes of papers by John S. Hagelin and other TM scientists that "a few have sneaked into mainstream science and medical journals unaware of the authors' TM affiliation." I assume that for Gardner to consider a journal "mainstream," he means those such as *JAMA* or *Physics Today*, which have rigorous peer review and editorial selection. While I am not in any way a supporter of TM "science," I am quite skeptical about papers being "sneaked into" quality journals. If Gardner has found bad science in reputable journals (he provided no references), I hope that he has brought this to the attention of their editors.

David M. Hassenzahl
Martinez, Calif.

See A. Skolnick, "The Maharishi Caper: JAMA Hoodwinked (But Just for a While)," SI, Spring 1992, pp. 254-259. The article referred to was published in the May 22-29, 1991, JAMA, with a correction in its August 14, 1991, issue. —EDITOR

Postmodernism Not New Age

As a freelance art critic with an M.A. in philosophy, I agree with much in your magazine. However, I was disturbed by the inaccurate treatment of postmodernism in "Postmodernism and New Age Unreason" by George Englebretsen (*SI*, Forum, May/June 1995), especially his linking it with New Age attitudes. By concentrating on Richard Rorty, who is actually a neopragmatist, Englebretsen ignored many other thinkers who have a variety of takes on postmodernism: The incredulity toward metanarratives of personal and societal emancipation (Jean-François Lyotard), the cultural moment of multinational capitalism (Frederic Jameson), the deconstruction of binary oppositions (Jacques Derrida), the situation where the real is replaced by signs of the real (Jean Baudrillard), and so forth.

Instead of critiquing these specific ideas, Englebretsen resorted to the familiar tactic of accusing those who believe in localized truths to be irrationalists. But here, he committed what Barbara Hernstein Smith called the Egalitarian Fallacy, which says that if the notion of objective truth is rejected, what follows is not that all theories are equally true, but that no theory is true in the objective sense. Just because the God's eye view is rejected, it does not follow that standards of valuation and truth are also thrown out.

Finally, New Age implies human potential movement cults and therapies that engage in magical thinking and believe that attitude change alone will bring about change in the world. For instance, Werner Erhard's Hunger

Project participants did not provide tools and knowledge to starving Third World people, but instead entered the "frame of mind" whereby hunger would be eliminated. Thus I agree that "unreason" applies to New Age, but disagree with equating it with postmodernism.

Alfred Jan
Santa Clara, Calif.

Compare to Population

In his account of the critical thinking class (May/June 1995), J. P. McLaughlin wonders why more journalists don't take CSICOP's instruction. But he also says that one of 80 students was a journalist.

This is greater than expected by chance. Rather, Mr. McLaughlin should ask why so many journalists (in Colorado, at least) do attend.

I am a newspaper reporter, and whenever I see "greater than" or "less than" statements, I multiply them out against the population concerned. Very often, as with McLaughlin, it turns out that through sloppy thinking or poor information, the statement has the sign wrong—plus or minus or the other way round.

While I am not opposed to critical thinking, it is hard work. My simple screening test has saved me from a lot of that.

Harry Eagar
Makawao, Hawaii

Megadoses of Vitamin C

In the May/June issue of *SI*, there were a number of letters that questioned Stephen Barrett's article "The Dark Side of Linus Pauling's Legacy" (*SI*, January/February 1995). Barrett's response to these letters understated the facts regarding the use of megadoses of vitamin C. The fact is that large quantities of vitamin C can be very harmful to many people. Victor Herbert of the Mount Sinai School of Medicine and Bronx Veterans Affairs Medical Center wrote a review article (*Nutrition Today*, January/February 1993) that documents numerous studies regarding the toxic effects of mega-C, including those experienced by Pauling, which range from mild discomfort to death. For those who want to make an informed judgment regarding the use of vitamin C, this paper provides a good starting point.

William DuBroff
Hendersonville, N.C.

Quantum Cosmology

Richard A. Crowe ("Is Quantum Cosmology Science?" *SI*, March/April 1995) writes that my skepticism of quantum cosmology (*SI*, Forum, Summer 1994) lacks "reasoned argument."

My objection—that Absolute Nothingness is a poor raw material out of which to make a universe—has not been "long-discredited." What quantum cosmological theorists do is endow this "Absolute Nothingness" with all sorts of qualities. This, I maintain, is not playing the game: Either you have Absolutely Nothing or you have Something (such as pre-existing quanta fluctuating in a pre-existing vacuum). You cannot have it both ways; at least you cannot if you wish to practice science.

It is not I who confuse "quantum genesis theory with inflationary models," it is the theorists and, incidentally, Crowe.

Many physicists insist that the Copenhagen Interpretation of quantum mechanics has become dogma. These include Einstein, de Broglie, Schrödinger, Bohm, Bell, and many others. At no point did I question the accuracy of quantum mechanics. What I question is the use to which QM has been put in certain cosmological theories.

Einstein opposed the Copenhagen Interpretation all his life. The General Theory of Relativity was always eminently testable and has been tested many times since 1916. When cosmological theories that the universe emerged without cause from total Nothingness are made testable, falsifiable, then something new and worthwhile will have been added to science that does not now exist.

Ralph Estling
Ilminster, England

Islam and Pseudoscience

I have read *SI* for many years and wished to make a comment. While recently working in Saudi Arabia I was able to see firsthand another culture's treatment of paranormal claims. Under Islam, magic and the paranormal are considered the truth (as they are mentioned in the holy Quran as existing). Any attempt to question these beliefs will and does produce severe retribution. In light of this, every possible type of fraud, misconception, and pseudoscience can flourish there. In particular, medical quackery is widespread. Belief, and especially belief without question, is the law of the land. Readers of *SI* should reflect on our ability to publish and read a magazine that in many places wouldn't be just unpublished but the entire staff punished by death.

(Note: Saudi mail censors only allowed in one copy of my *SI* during my two years there—probably by mistake!)

Name and address
withheld by request

Another Literary Science Blunder

Could you find space for just one more contribution relating to Martin Gardner's hornet's nest of Literary Science Blunders? (*SI*, March/April 1995.) When contemplating Velasquez's famous painting of the Rokeby Venus in London's National Gallery, I was struck by a jarring blunder: The orientation of the mirror figure in the painting, as well as the reflection of the woman's face in it, were in no relation to the position of her head. I later found other paintings containing mirrors similarly violating simple optical laws. Yet, when I asked a number of my nonscientist friends (with Velasquez's painting), "Do you see anything wrong in this picture?" the invariable answer was, "no." "Do you not notice that the reflection in the mirror is peculiar?" Response: "Maybe . . . so what?" Perhaps theirs is the right attitude.

Felix E. Planer
Chailly, Switzerland

The letters column is a forum for views on matters raised in previous issues. Letters should be no more than 250 words. Due to the volume of letters, not all can be published. They should be typed double-spaced. Address: Letters to the Editor, SKEPTICAL INQUIRER, 944 Deer Dr. NE, Albuquerque, NM 87122.

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- Maintains a network of people interested in critically examining paranormal, fringe-science, and other claims, and in contributing to consumer education
- Prepares bibliographies of published materials that carefully examine such claims
- Encourages research by objective and impartial inquiry in areas where it is needed
- Convenes conferences and meetings
- Publishes articles that examine claims of the paranormal
- Does not reject claims on a priori grounds, antecedent to inquiry, but examines them objectively and carefully

The Committee is a nonprofit scientific and educational organization. The SKEPTICAL INQUIRER is its official journal.